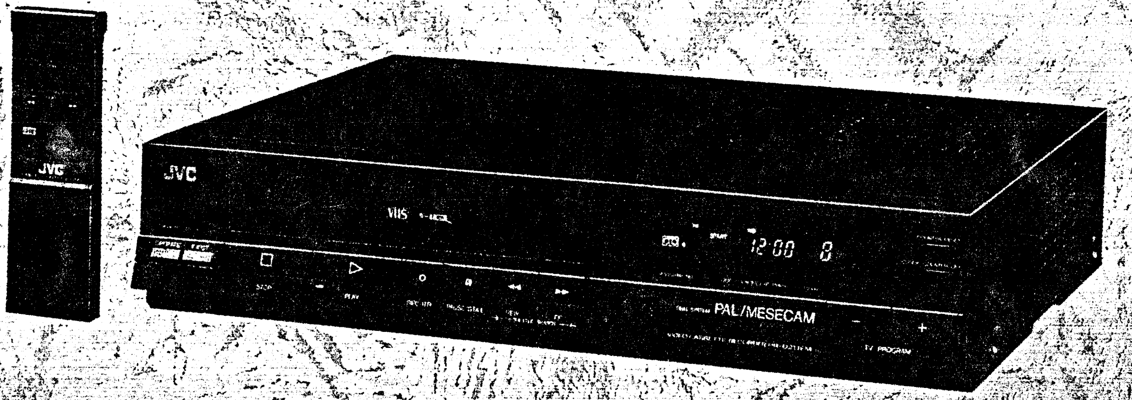
JVC

SERVICE MANUAL

VIDEO CASSETTE RECORDER VHS

HR-D211EM



HQ

INDEX
VHS INDEX SEARCH SYSTEM

SPECIFICATIONS

Format : VHS PAL standard
Recording system : Rotary, slant azimuth two-head helical scan system
Video signal system : PAL colour and CCIR monochrome signals, 625 lines
Tape width : 12.65 mm
Playing time : 240 min. with E-240 video cassette
Temperature
  Operating : 5°C to 40°C
  Storage : -20°C to 60°C
Channel coverage : VHF band I, channels 2 – 4
  VHF band III, channels 5 – 12
  UHF band IV/V, channels 21 – 69
Aerial output : UHF channels 32 – 40 (adjustable)
Power consumption : 28 watts
Power requirement : 110/127/220/240 V∿, 50/60 Hz
Video
  Input : 0.5 to 2.0 Vp-p, 75 ohms, unbalanced
  Output : 1.0 Vp-p, 75 ohms, unbalanced
  Signal-to-noise ratio : 43 dB (Rohde & Schwarz noise meter)
  Horizontal resolution : 250 lines

Audio
  Input : Line: –20 dBs, 50 k-ohms, unbalanced
  Output level : –6 dBs, high impedance load
  Output impedance : Less than 1 k-ohm, unbalanced
  Signal-to-noise ratio : More than 40 dB
  Frequency range : 70 Hz to 10,000 Hz
Timer : 14-day/4-programme timer
Dimensions : 435 mm(W) x 95 mm(H) x 341 mm(D)
Weight : 6.5 kg
Provided accessories : Aerial cable,
  Infrared remote control unit,
  "R6" battery x 2
  Plug adapter

Design and specifications subject to change without notice.

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No. 8
October 1

NOTE: For a technical description, please refer to Technical Guide VTG82003 HR-D210 PAL

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Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (▨) parts are critical for safety.
   Replace only with specified part numbers.
   Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

4. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers
   4) Insulation sheets for transistors

5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

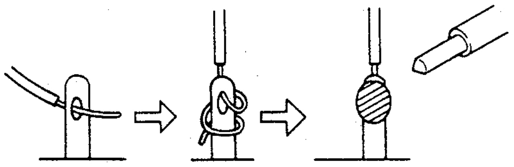

Fig. 1

6. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

7. Check that replaced wires do not contact sharp edged or pointed parts.

8. When a power cord has been replaced, check that 10–15 kg of force in any direction will not loosen it.

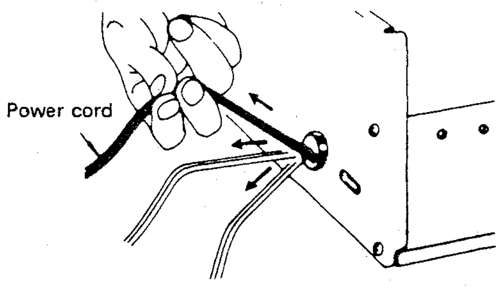

Fig. 2

9. Also check areas surrounding repaired locations.

10. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

11. Crimp type wire connector
    In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.
    1) **Connector part number** : E03830-001
    2) **Required tool** : Connector crimping tool of the proper type which will not damage insulated parts.
    3) **Replacement procedure**
       (1) Remove the old connector by cutting the wires at a point close to the connector.
       Important : Do not reuse a connector (discard it).

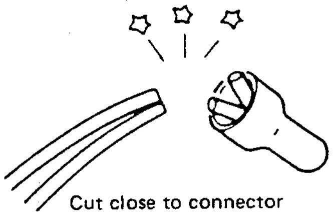

Fig. 3

(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

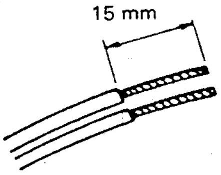

Fig. 4

(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

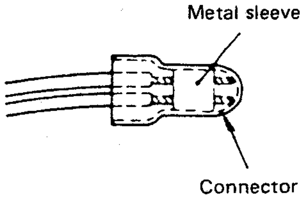

Fig. 5

(4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

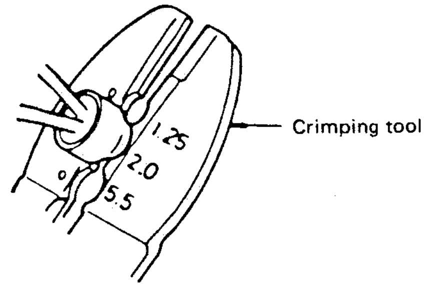

Fig. 6

(5) Check the four points noted in Fig. 7.

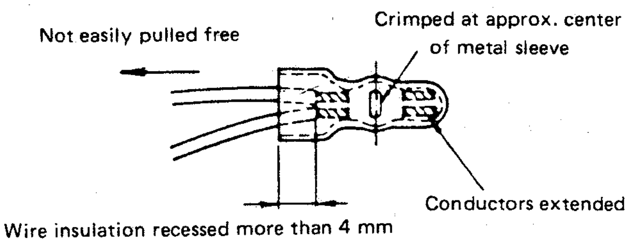
Not easily pulled free
Crimped at approx. center of metal sleeve
Conductors extended
Wire insulation recessed more than 4 mm

Fig. 7

• Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions, Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. **Insulation resistance test**
   Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table below.
2. **Dielectric strength test**
   Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table below.
3. **Clearance distance**
   When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table below.

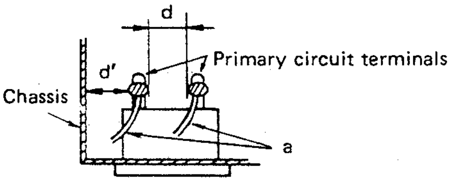

Fig. 8

4. **Leakage current test**
   Confirm specified or lower leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

   Measuring Method: (Power ON)
   Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure and following table.

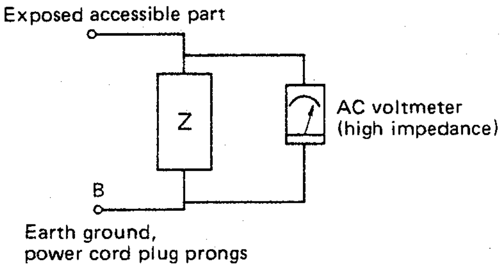
Exposed accessible part
Z
AC voltmeter (high impedance)
B
Earth ground, power cord plug prongs

Fig. 9

AC Line Voltage	Region	Insulation Resistance	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	≧ 1 MΩ/500 V DC	1 kV 1 minute	≧ 3 mm
110 to 130 V	USA & Canada	—	900 V 1 minute	≧ 3.2 mm
*110 to 130 V 200 to 240 V	Europe Australia	≧ 10 MΩ/500 V DC	4 kV 1 minute	≧ 6 mm (d) ≧ 8 mm (d') (a: Power cord)

*Class II model only.

Table 1 Ratings for selected areas

AC Line Voltage	Region	Load Z	Leakage Current (i)	Earth Ground (b) to:
100 V	Japan	1 kΩ	i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada	0.15 µF 1.5 kΩ	i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe Australia	2 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Antenna earth terminals
		50 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Other terminals

Table 2 Leakage current ratings for selected areas

Note: This table is unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

Thank you for purchasing the JVC HR-D211EM Video Cassette Recorder. Before use, read this instruction booklet carefully for obtaining the best results from your new unit.
Diagrams are on the reverse side of this page. Fold it out and keep it opened so that you can refer to the diagrams when you are reading this booklet.

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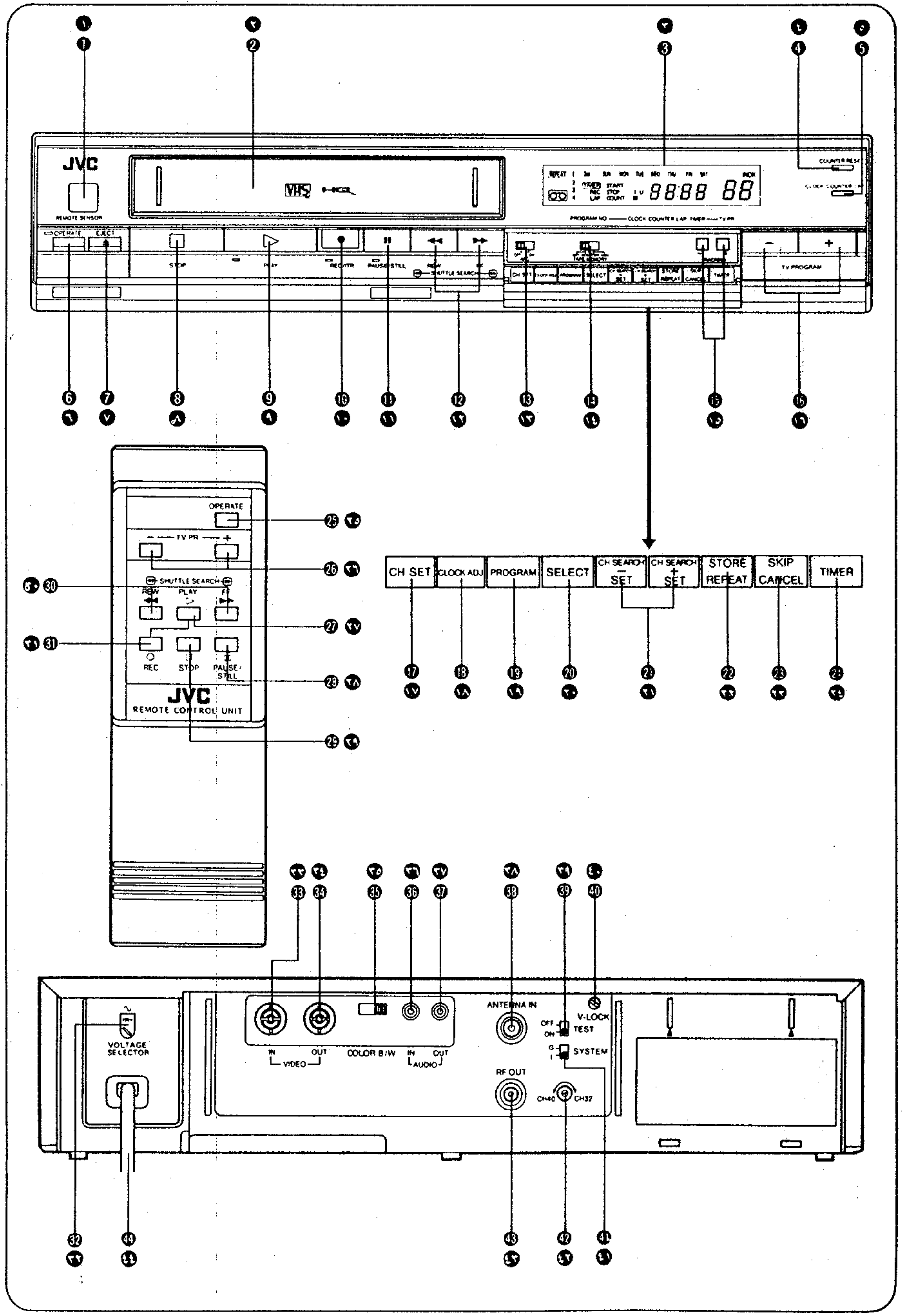

①
②
③
④
⑤
JVC
REMOTE SENSOR
VHS
COUNTER RESET
CLOCK COUNTER
8888 88
OPERATE
EJECT
STOP
PLAY
REC/OTR
PAUSE/STILL
REW
FF
SHUTTLE SEARCH
TV PROGRAM
−
+
⑥
⑦
⑧
⑨
⑩
⑪
⑫
⑬
⑭
⑮
⑯
CH SET
CLOCK ADJ
PROGRAM
SELECT
CH SEARCH − SET
CH SEARCH + SET
STORE REPEAT
SKIP CANCEL
TIMER
⑰
⑱
⑲
⑳
㉑
㉒
㉓
㉔
OPERATE
− TV PR +
SHUTTLE SEARCH
REW
PLAY
FF
REC
STOP
PAUSE/STILL
JVC
REMOTE CONTROL UNIT
㉕
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㊵
VOLTAGE SELECTOR
IN
OUT
VIDEO
COLOR B/W
IN
OUT
AUDIO
ANTENNA IN
V-LOCK
OFF
ON
TEST
SYSTEM
RF OUT
CH40
CH32
㉜
㊹
㊸
㊷
㊶

SAFETY PRECAUTIONS

The rating plate and the safety caution are on the rear of the unit.

WARNING – DANGEROUS VOLTAGE INSIDE
WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

IMPORTANT (In the United Kingdom)
Mains Supply (240 V~, 50 Hz only)

IMPORTANT

Do not make any connection to the Larger Terminal coded E or Green. The wires in the mains lead are coloured in accordance with following code:

Blue to N (Neutral) or Black
Brown to L (Live) or Red,

If these colours do not correspond with the terminal identifications of your plug, connect as follows:
Blue wire to terminal coded N (Neutral) or coloured Black.
Brown wire to terminal coded L (Live) or coloured Red.
If in doubt – consult a competent electrician.

Note
We recommend that you should disconnect the AC cord from the outlet.

CAUTION
- Disconnect the mains plug from the supply socket when not in use.
- When you are not using the HR-D211EM for a long period of time, it is recommended that you disconnect the power cord from the AC outlet.
- Dangerous voltage inside. Refer internal servicing to qualified service personnel. To prevent electric shock or fire hazard, remove the power cord from the AC outlet prior to connecting or disconnecting any signal lead or aerial.

- Only cassettes marked "VHS" can be used with this video cassette recorder.
- HQ VHS is compatible with existing VHS equipment.

FOR YOUR SAFETY (in Australia)
Install any external aerial to AS 1417.1

Omkopplaren OPERATE på denna apparat är sekundärt kopplad och skiljer inte apparaten från nätet i läge OPERATE OFF.

The OPERATE button does not completely shut off mains power from the unit, but switches operating current on and off.

BEMAERK: I stilling OFF er apparatet stadig forbundet med lysnettet Hvis det ønskes fuldstændig afbrudt skal netledningen trækkes ud.

This unit is produced to comply with Directive 82/499/EEC.

POWER SYSTEM

Connection to the mains supply
The operating voltage of this set is preset to 220 V~ at the factory.
Before connecting to mains, check that the voltage selector on the rear panel is set to the same voltage as your local mains supply.

Adapting to local power line
This set operates on 110, 127, 220 or 240 V~.
If the preset voltage is different from the power line voltage in your area, reset the voltage selector by inserting a screwdriver into the slot of the voltage selector and turning it until the correct voltage is displayed.

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FEATURES

High-quality pictures
- **HQ (High Quality) System technologies** with a Detail Enhancer, and 20 % higher white clip level.

Advanced tape access features
- **VHS Index Search System** facilitates location of the beginning of each recording by automatically marking an index code on the control track of the tape; index codes can be detected in the Shuttle Search mode. This system is based on the newly standardised CTL coding system for VHS.
- Counter search for returning to a designated point on a tape.

Convenient automatic functions
- **Auto play function:** insert a cassette (with safety tab removed), and playback will start automatically.
- **Next-function memory** allows a command to be entered immediately after pressing REW (or FF), with the second command "remembered" and performed automatically after the tape rewinds to its beginning or fast-forwards to the counter reading of "0000".
  - – Memory play: for automatic start of playback.
  - – Memory eject: to eject the cassette after rewind, without waiting for completion of rewind.
  - – Memory timer standby: to engage the timer recording standby mode after rewind.
  - – Memory power-off: to turn the power off after rewind.
- Automatic backspace editing.
- Auto-power-on convenience.
- Power-off ejection.
- Automatic rewind at the end of tape.

Other value features
- **PAL/MESECAM dual-system.**
- **Multi-voltage power source adaptable to 110/127/220/240 V~.**
- **Voltage synthesized tuner** with 32-channel preset capacity; can receive VHF and UHF channels.
- **14-Day/4-event programmable timer.**
- **Overlapped programme warning:** programme numbers on the FDP blink when the preset time spans of the programmes overlap.
- **Timer programme review** to show the preset programme contents in the order of execution.
- **Infrared remote control.**
- **On-screen record-pause mode display** with elapsed time indicated by shrinking white bar.
- Electronic tracking controls.
- Instant timer recording function using the REC/ITR button.
- **Shuttle Search with latch function:** with the Shuttle Search button locked or held depressed, offers high-speed playback at 9 times normal speed in either direction.
- Still and frame advance.
- Comprehensive fluorescent display.
- Elapsed recording time indicator.

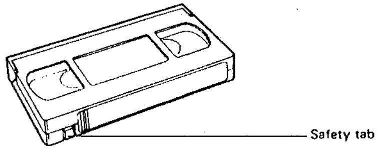
PRECAUTIONS

Handling and storage

- Avoid using the recorder under the following conditions:
  - extremely hot, cold or humid places,
  - dusty places,
  - near appliances generating strong magnetic fields,
  - places subject to vibrations, and
  - poorly ventilated places.
- Be careful of moisture condensation.
  Avoid using the recorder immediately after moving from a cold place to a warm place. The water vapour in warm air will condense on the still-cold video head drum and tape guides and may cause damage to the tape and the recorder.
- Handle the recorder carefully.
  - Do not block the ventilation openings.
  - Do not place anything heavy on the recorder.
  - Do not place anything which might spill and cause trouble on the top cover of the recorder.
  - Use in horizontal (flat) position only.
- In case of transportation,
  - Avoid violent shocks to the recorder during packing and transportation.
  - Before packing, be sure to remove the cassette from the recorder.

Video cassettes

- This recorder employs VHS-type cassettes only.
  E-240 for 4 hours, E-180 for 3 hours, E-120 for 2 hours, E-90 for 1 hour and 30 minutes, E-60 for 1 hour and E-30 for 30 minutes of recording.
- Video cassettes are equipped with a safety tab to prevent accidental erasure. When the tab is removed, recording cannot be performed. If you wish to record on a cassette whose tab has already been removed, use adhesive tape to block the hole.



- Avoid exposing the cassettes to direct sunlight. Keep them away from heaters.
- Avoid extreme humidity, violent vibrations or shocks, strong magnetic fields (near a motor, transformer or magnet) and dusty places.
- Place the cassettes in cassette cases and position vertically.

Moisture condensation

- If you pour a cold liquid into a glass, water vapour in the air will condense on the surface of the glass. This is called moisture condensation.
- Moisture condensation on the head drum, one of the most crucial parts of the video recorder, will cause damage to the tape.
- Moisture condensation is apt to occur under the following conditions:
  - when the recorder is moved from a cold place to a warm place, and
  - under extremely humid conditions.
- In conditions where moisture condensation may occur, keep the power cord plugged in an AC outlet and the OPERATE switch set to ON; this would help prevent condensation from occurring. When condensation has occurred, it will not evaporate quickly once the power is switched on. Wait a few hours for the recorder to become dry.

Operation

- When a cassette is loaded, the power is switched on automatically.
- The cassette can be unloaded even when the power is off. Pressing the EJECT button turns the power on and, after ejection of the cassette, shuts it off automatically in this case.
- As long as the TIMER button is engaged with the TIMER indicator lit, the OPERATE and EJECT buttons have no effect and unloading of a cassette is not possible. If a cassette has not yet been inserted, simply insert a cassette; the power will be switched on to load the cassette properly and, after completion of automatic loading, the Timer Recording Standby mode will be engaged with power off.

Remote control unit

- Avoid violent shocks, especially take care not to drop the unit.
- Take care not to allow liquid to spill into the unit.
- Do not place heavy objects on the unit.
- Avoid leaving the unit in places subject to direct sunlight or extremely high temperatures.

WARNING

1. This PAL/MESECAM recorder can record SECAM broadcasts in the Middle East and play back those SECAM recordings made with this recorder.
2. SECAM tapes recorded with this recorder will present black-and-white pictures when they are played back on SECAM-VHS recorders.
3. Tapes recorded with SECAM-VHS recorders or pre-recorded SECAM tapes will present black-and-white pictures when they are played back with this recorder.

IMPORTANT: It is permissible to record television programmes only in the event that third party copyrights and other rights are not violated.

CONTROLS, INDICATORS AND CONNECTORS

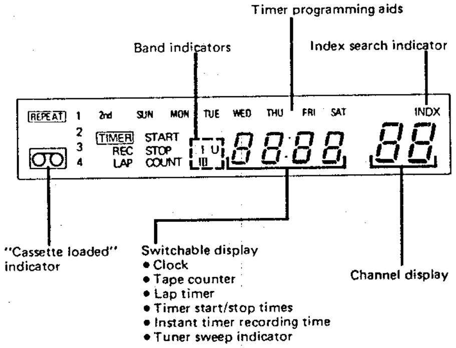
Refer to the diagrams on the front foldout page.

Front Panel

① Infrared beam receiving window (REMOTE SENSOR)

② Cassette loading slot
Insert a VHS cassette. The door will close and the "cassette loaded" indicator will appear on the FDP (fluorescent display panel).

③ Fluorescent display panel
Fully explained in relevant sections.



④ COUNTER RESET button
Press to reset the counter reading or lap time to "0000" or "0 : 00" respectively.

⑤ CLOCK/COUNTER/LAP button
Press to switch the display among clock, tape counter (COUNT) and lap time (LAP). Also used to change the display from the timer programming mode to the clock mode.

⑥ OPERATE button with LED indicator
Press to apply operating power to the recorder. The indicator will light. Loading a cassette also turns the power on.

⑦ Cassette EJECT button

⑧ STOP button
Press to stop the tape.

⑨ PLAY button with LED indicator
Press to play back the tape or cancel the Pause/Still and Search modes.

⑩ REC/ITR button with LED indicator
Press once to start recording. Pressing it again engages the Instant Timer Recording mode. See page 9.

⑪ PAUSE/STILL button with LED indicator
Press to stop the tape temporarily to avoid recording of unwanted material or to view a still picture. The still picture can be advanced step by step or continuously.

⑫ REW and FF (SHUTTLE SEARCH) buttons
Press while in the Stop mode to rewind or fast-forward the tape; press while in the Play mode to view the speeded-up picture for programme search. See pages 8 and 10.

⑬ AFC switch
Normally set to ON.

⑭ TAPE MEMORY switch

COUNTER:	The tape will stop automatically at the counter reading of about "0000" in the Rewind or Fast Forward mode. See page 10.
INDEX:	The index code marked at the beginning of each recording will be detected in the Shuttle Search mode for automatic start of playback. See page 10.
OFF:	Set to OFF if you are not going to use either of the two functions.

⑮ TRACKING -/+ buttons
Press either button to minimise noise bars, if observed, during playback.

⑯ TV PROGRAM -/+ buttons
Press either button to select a desired channel.

⑰ CH SET button
Press this button to engage or disengage the tuner preset mode (see page 7).

⑱ CLOCK ADJ button
Press to adjust the clock.

⑲ PROGRAM button
Press to programme the timer.

⑳ SELECT button
Press to select the band in tuner presetting; press to select the item to be set in clock setting or timer programming.

㉑ CH SEARCH/SET -/+ buttons
Press to search for broadcast programmes in tuner presetting; press to set to the correct data in clock setting or timer programming.

㉒ STORE/REPEAT button
Press to store the tuned-in channel in tuner presetting; press to enter the repeat command in timer programming.

㉓ SKIP/CANCEL button
Press to skip unnecessary channels in tuner presetting; press to cancel the preset programme in timer programming.

㉔ TIMER button
Press to engage the timer recording standby mode.

Remote Control Unit

㉕ OPERATE button
Press to turn the recorder power on or off.

㉖ TV PR. -/+ buttons
Press either button to select a desired channel.

㉗ PLAY button

㉘ PAUSE/STILL button

㉙ STOP button

㉚ REW and FF (SHUTTLE SEARCH) buttons

㉛ REC button
Press together with the PLAY button to start recording.

Operating distance for remote control unit

- The maximum operating distance is about 8 m.

Installing the batteries

- Insert two "R6"-size batteries (provided) into the battery compartment on the rear of the remote control unit, observing correct polarity.

Rear Panel

㉜ **VOLTAGE SELECTOR**
The preset voltage is indicated in the window. If it differs from your local power line voltage, reset it. See "Power System" on page 1.

㉝ **VIDEO IN connector**
Connect the video output of other video equipment such as another video tape recorder for recording video signals.

㉞ **VIDEO OUT connector**
Video signals being recorded or played back are available from this connector.

㉟ **Video mode select switch**
This applies to both recording and playback.
COLOR: Set to this position when the input or playback video signal is in colour.
B/W: Set to this position when the input or playback video signal is monochrome.

㊱ **AUDIO IN connector**
Connect an audio tape recorder or other audio sources for recording sound.

㊲ **AUDIO OUT connector**
Audio signals can be obtained from this connector.

㊳ **Aerial input connector (ANTENNA IN)**
Connect an aerial to this connector.

㊴ **TEST signal switch**
Set to ON when tuning your TV receiver for the VIDEO CHANNEL. A test signal in the form of two vertical white bars will be available.

㊵ **V-LOCK adjustment screw**
When operating in the Still mode, adjust this screw to eliminate any vertical vibration of the picture. (For any inquiry about this adjustment, contact a JVC dealer.)

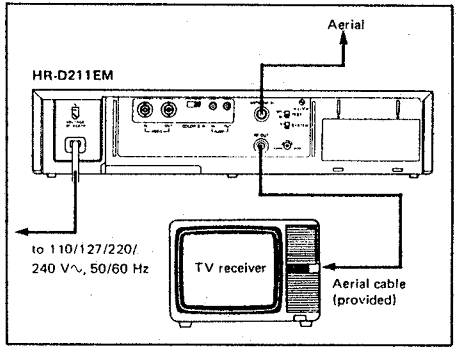
㊶ **SYSTEM select switch**
Selects the system of the built-in RF converter.
Select G or I depending on the system of your television receiver.
This switch is preset to G prior to shipment.

㊷ **RF converter frequency adjustment screw**
See below.

㊸ **RF OUT connector**
Connect to the aerial connector of a TV receiver through the aerial cable (provided).

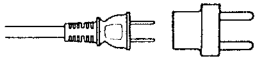
㊹ **Power cord**

CONNECTIONS



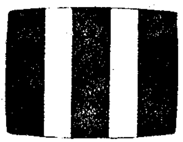
1. Remove the aerial cable from the TV receiver and reconnect it to the recorder's ANTENNA IN ㊳ connector. The recorder is then ready to record off-air programmes.
2. Connect the recorder's RF OUT connector ㊸ to the TV receiver's aerial terminal using the provided aerial cable. The TV receiver is then ready to receive broadcast programmes as well as accommodate video cassette playback.

- Use the plug adapter (provided) depending on the type of your AC wall outlet.



VIDEO CHANNEL SETTING

1. Press the OPERATE button ⑥ to turn the power on. Turn on the TV receiver.
2. Set the TEST switch ㊴ to ON.
3. Adjust your TV receiver in the vicinity of UHF channel 36 until you bring in the two white signal bars on the screen as illustrated. This is your VIDEO CHANNEL.

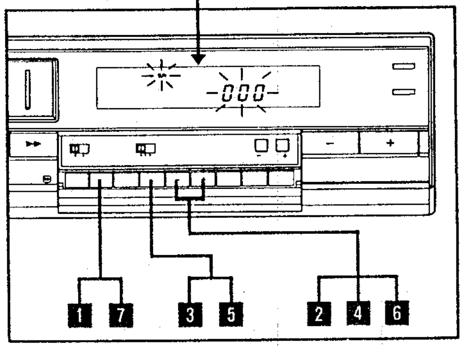


4. Reset the TEST switch to OFF.

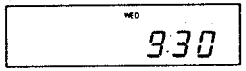
Notes:
- If some interference noise is seen on the screen because of broadcasts on neighbouring channels or if your preset broadcasts should be affected in picture quality, it is necessary to shift the RF converter output frequency from that of channel 36. Consult your JVC dealer for making this adjustment.
- Video channel setting is also possible using a prerecorded VHS video cassette. Play back the tape and tune the TV receiver to obtain clear pictures and sound while monitoring the playback picture on the TV screen.
- If your TV receiver is not provided with an AFC circuit, perform fine tuning of the TV receiver when you are actually viewing video cassettes.
- Set the SYSTEM select switch ㊶ to the appropriate position.

CLOCK SETTING

Plug the recorder into an AC outlet. The display shows a blinking SUN 0:00.



1. Press CLOCK ADJ ⑱. The indicated day will blink.
2. Press SET ㉑ until the correct day indication appears.
3. Press SELECT ⑳. The indicated hour digits will blink.
4. Press SET until the correct hour indication appears.
5. Press SELECT. The indicated minute digits will blink.
6. Press SET until the correct minute indication appears.
7. Press CLOCK ADJ at the exact instant of the time signal and clock will be set accurately to the present time.



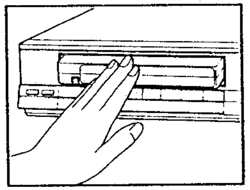
Power failure indicator
The blinking SUN 0:00 (initial condition of the display) is also a power failure indicator, showing that there has been a power failure exceeding 10 seconds. Re-adjusting the time restores the normal condition of the clock display.

Note:
- Clock setting is not possible in the timer recording standby mode. First check to see that the TIMER indicator on the FDP is not lit.

LOADING AND UNLOADING A CASSETTE

Loading

Insert a cassette as illustrated. Be sure to insert it firmly into the slot; otherwise, it will be automatically ejected.



- The automatic loading mechanism will operate only when the cassette is inserted correctly.
- With a cassette inserted, the "cassette loaded" indicator will appear on the FDP.

Unloading

Press the EJECT button ⑦.

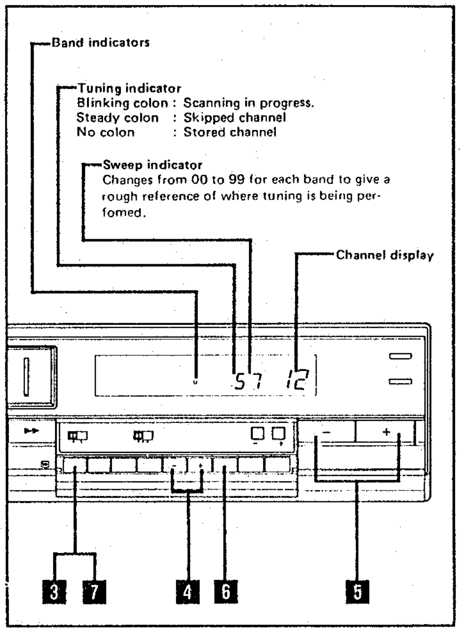
CAUTION
- If unloading of the cassette is not possible, check to see whether the TIMER indicator is lit. If so, press the TIMER button so the TIMER indicator extinguishes.
- Do not attempt to pull out the cassette once automatic loading has started.
- Do not insert fingers or any foreign object beyond the door of the cassette loading slot, as this could lead to injury or damage to the mechanism. Show special caution with children.

AUTO POWER-ON AND AUTO PLAY SYSTEM
- The cassette can be loaded even when the power has not been turned on. Inserting a cassette into the loading slot turns the power on automatically.
- Inserting a cassette, with its safety tab removed, turns the recorder on and playback of the cassette begins automatically.

POWER-OFF EJECT SYSTEM
- The cassette can be unloaded even after the power has been turned off. Pressing the EJECT button turns the power on automatically and, after ejection of the cassette, shuts it off automatically.

OPERATING THE BUILT-IN TUNER

The HR-D211EM incorporates a voltage synthesized tuner with 32-channel preset capacity. Only channels stored can be called up with the TV PROGRAM buttons in modes other than Channel Set. In the Channel Set mode, all channel numbers including skipped ones are successively displayed so that they can be stored or skipped.


Band indicators
Tuning indicator
Blinking colon : Scanning in progress.
Steady colon : Skipped channel
No colon : Stored channel
Sweep indicator
Changes from 00 to 99 for each band to give a rough reference of where tuning is being perfomed.
Channel display
57 12
3
7
4
6
5

Storing channels

1 Turn on the TV receiver and adjust it to your video channel.
2 Turn on the recorder.
3 Press CH SET ⑰.
4 Press SELECT ⑳ until the correct band indication appears.
5 Press CH SEARCH ㉑ until the desired broadcast signal is detected; use either the "–" or "+" button depending on the direction of search.

- The tuning indicator "colon" will blink and the sweep indicator will count down or up.

6 Press TV PROGRAM ⑯ to select the channel to be stored.
7 Press STORE ㉒. The "colon" will disappear.

- Repeat steps 4 through 7 for all necessary channels.

8 Press CH SET to disengage the Channel Set mode.

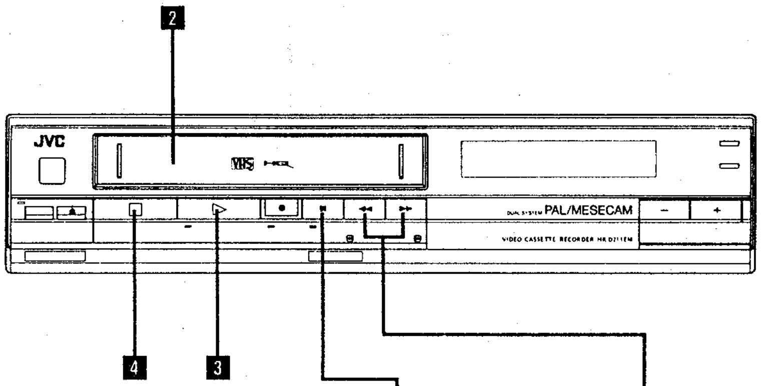
Skipping channels

1. Press TV PROGRAM to select the channel to be skipped.
2. Press CH SET.
   - The band indicator and the sweep indicator corresponding to the broadcast stored in that channel will appear.
3. Press SKIP ㉓. The steady "colon" will appear.
4. Press CH SET to disengage the Channel Set mode.

Available channels in each band

Band indicator	Channels
I	VHF band I, channels 2 – 4
III	VHF band III, channels 5 – 12
U	UHF band IV/V, channels 21 – 69

PLAYING BACK A VIDEO CASSETTE


2
JVC
VHS HQ
DUAL SYSTEM PAL/MESECAM
VIDEO CASSETTE RECORDER HR-D211EM
4
3

1 Turn the TV receiver on and adjust it to your video channel.
2 Load a pre-recorded cassette.

- Power will be switched on automatically.
- When the cassette loaded has no safety tab, playback will start automatically.

3 Press PLAY ⑨.
4 Press STOP ⑧ at the end of the programme.

- The tape will be rewound automatically when its end is reached and the recorder will enter the Stop mode.

SHUTTLE SEARCH

Shuttle Search allows high-speed playback at 9 times normal speed in either direction.

1. Press either REW or FF SHUTTLE SEARCH ● during playback.
2. To cancel the Search mode, press PLAY.
   - For briefer scanning, keep the SHUTTLE SEARCH button pressed for more than 2 seconds; when you release the button, the Search mode will be cancelled.

STILL PICTURE

1. Press PAUSE/STILL ⑪ during playback.
2. To advance the still picture, press PAUSE/STILL a number of times.
   - Keeping this button pressed continuously advances the picture to give a slow-motion effect.
3. To cancel the Still mode, press PLAY.

Notes:

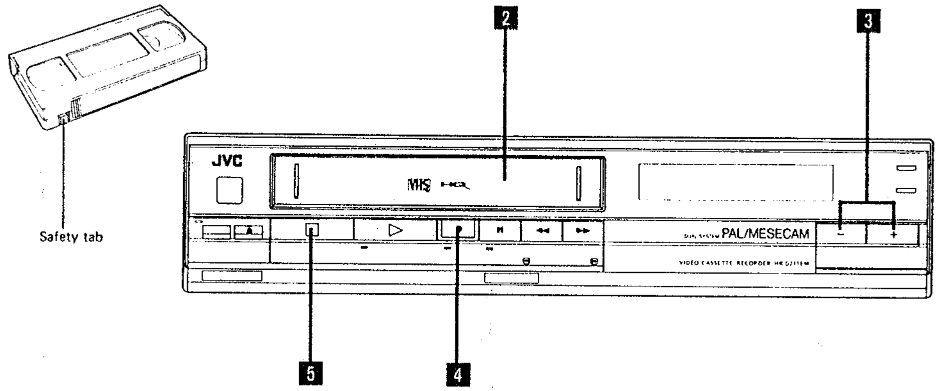
- When the Still mode continues for longer than about 5 minutes, the Stop mode will be entered automatically.
- With some televisions, the still picture may be unstable. This is not due to any defect of the unit.

Tracking Adjustment

Noise bars may appear on the screen if you play back a tape which was recorded using another recorder. For correction, press either TRACKING control ●. Tracking will be reset to the preset standard each time the cassette is ejected.

Note:
Only SP (Standard Play) recordings can be played back.

RECORDING TV PROGRAMMES



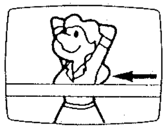
1 Turn the TV receiver on and adjust it to your video channel.

2 Load a cassette (with safety tab in place).
- Power will be switched on automatically.

3 Press either TV PROGRAM ⑯ to select the channel you wish to record.

4 Press REC/ITR ⑩ to start recording.
- Be careful to press REC/ITR only once, or Instant Timer Recording will begin.
- Press REC and PLAY simultaneously when using the remote control unit.
- If there is part of the programme you don't want to record, press PAUSE/STILL ⑪. A white horizontal bar will appear on the screen, which reduces in size in 4 steps as time elapses. When the last quarter starts blinking and disappears, the Stop mode will be entered automatically. The pause duration is possible for about 5 minutes.

Pause mode indicator

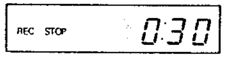


- To continue recording from the Pause mode, press PLAY ⑨ while the white bar is on-screen.

5 Press STOP ⑧ at the end of the programme.
- When the end of the tape is reached during recording, the tape is automatically rewound and stops.

Notes:
- If you want to start recording from the Play mode, first engage the Record-Pause mode by pressing REC/ITR and PAUSE/STILL simultaneously and then press PLAY.
- When recording is restarted from the Pause mode, a few frames recorded before are erased due to overlap of the new recording. This is not due to any defect of the unit.
- The selected channel cannot be altered during recording. If you wish to change the channel, first engage the Pause mode and then select a different channel.

INSTANT TIMER RECORDING



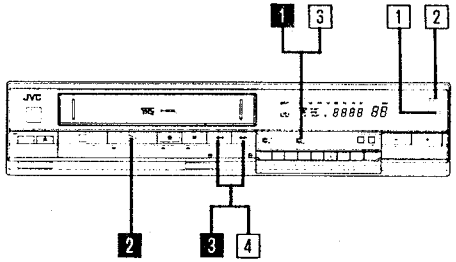
If you wish for recording to stop automatically after a certain period of time, use this Instant Timer Recording mode.

1. Press REC/ITR during recording (or twice if in the Stop mode).
   - The FDP shows "REC STOP 0:30", showing that recording will automatically stop and power will switch off after 30 minutes.
2. Adjust the switch-off time, if necessary.
   - Press REC/ITR to increase it in 30-minute increments (possible up to 4 hours).
   - Use SELECT and SET to set to a more precise time when required (possible up to 4 hours 59 minutes). After setting the time, press SELECT so that all digits stop blinking.

RECORDING ONE PROGRAMME WHILE WATCHING ANOTHER

A programme not being viewed can be recorded while you enjoy another programme.
- Select the channel you wish to record with the recorder's TV PROGRAM buttons.
- Select the channel you wish to view with the TV receiver's channel selector.

INDEX SEARCH AND COUNTER SEARCH



VHS Index Search System

When you start recording from the Stop or Timer Stand by mode, an index code is marked on the tape. These index codes can be detected in the Shuttle Search mode.

1 Set TAPE MEMORY ⑱ to INDEX.

2 Press PLAY ⑨ to start playback.

3 Press REW or FF SHUTTLE SEARCH ⑦ depending on the direction of search.
- While the tape is being scanned, "INDX" will be displayed on the FDP.

4 When the first index code is detected, normal playback resumes automatically. To search for the next index code, press the same button once again.

Counter Search

The counter reading of "0000" can be located automatically.

1 Press CLOCK/COUNTER/LAP ⑤ to obtain the Counter mode.

2 Press COUNTER RESET ④ during playback or recording at a point which you wish to locate later.

3 Set TAPE MEMORY to COUNTER.

4 Press REW or FF when you need to return to the designated point.
- The tape will stop automatically at about "0000".
- When used in conjunction with the Memory Play function, this offers more convenience. See below.

ELAPSED RECORDING TIME INDICATOR

The tape counter is switchable to the elapsed recording time indicator.

1. Press CLOCK/COUNTER/LAP to obtain the Lap mode.
   - The lap time is counted up to 9 hours 59 minutes.
2. To reset the lap time to "0:00", press COUNTER RESET.

Notes:
- Unless the COUNTER RESET button is pressed in the Lap mode, the count is maintained even after the power is switched off (as long as the unit remains plugged in to an AC outlet).
- When the Lap mode is engaged during playback, counting does not take place, even though the current count is displayed.

NEXT-FUNCTION MEMORY

Memory Play function

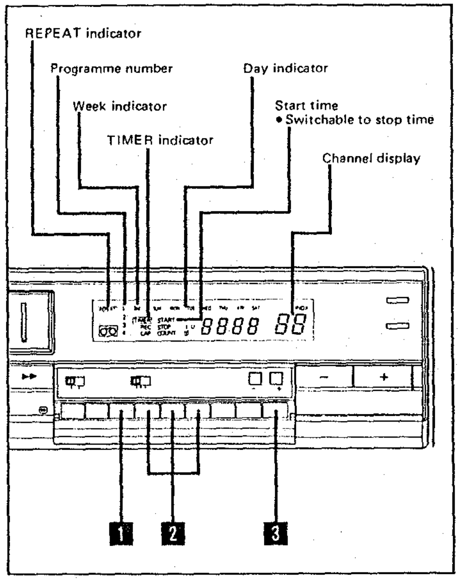
- If you want to watch the tape from its beginning after rewinding, press REW and then PLAY within 2 seconds. Playback will start automatically at the beginning of the tape. (The TAPE MEMORY switch must be in the OFF position.)
- If you want to watch the tape from the counter reading of "0000", set TAPE MEMORY to COUNTER, press REW (or FF) and then PLAY within 2 seconds.

Memory Eject/Power-Off/Timer Standby

If you are going to eject the cassette, turn the power off or engage the Timer Standby mode after rewinding the tape, you do not have to wait for completion of rewind to press the corresponding button.
- To eject the cassette after rewind, press REW and then EJECT within 2 seconds.
- To turn the power off after rewind, press REW and then OPERATE within 2 seconds.
- To engage the Timer Standby mode after rewind, press REW and then TIMER within 2 seconds.

AUTOMATIC TIMER RECORDING

First of all, load a cassette (with safety tab in place); power will be switched on automatically.



Setting the day

- With the SET "+" button, the day indication advances from "SUN" (first Sunday) to "SAT" (first Saturday), then "2nd SUN" (second Sunday) to "2nd SAT" (second Saturday) and then the all-days indication with "REPEAT" for daily serial recording.
- For weekly serial recording, press the REPEAT button any time in the Timer Set mode.
- The "REPEAT" entry can be cancelled by pressing the REPEAT button.

Setting the start and stop times

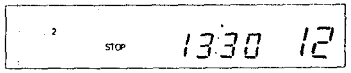
- It is not possible to set the start and stop times unless the clock has previously been set.
- Enter the data while the digits are blinking.
- The stop time can be set within 24 hours from the start time.

Cancelling the preset data

- The preset programmes can be cancelled. First engage the Timer Set mode for the programme number you wish to cancel and then press the CANCEL ㉓ button.

1 Press PROGRAM ⑲.
  - The display will change to the Timer Set mode for programme number "1". To advance to programme number 2, 3 or 4, press PROGRAM.

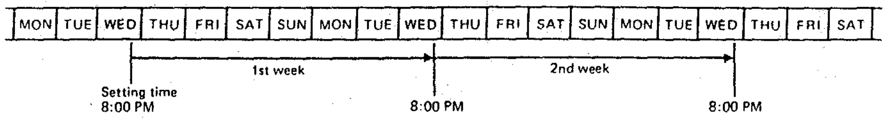
2 Set the day, start time, channel and stop time in succession by using the SELECT and SET buttons ⑳ ㉑ alternately.
  - Select the item to be set with the SELECT button; the selected item will blink.
  - Set the desired data with the SET buttons.



3 After making sure that the cassette is loaded, press TIMER ㉒.
  - The Timer Recording Standby mode will be engaged with the TIMER indicator and the preset programme number(s) illuminated and the power turned off.
  - With no cassette loaded, the TIMER and "cassette loaded" indicators will continue blinking.
  - A cassette whose safety tab has been removed will be ejected automatically.
  - If a preset programme contains errors, that programme number will not be illuminated. Recheck the programmed data.
  - If illuminated programme numbers are blinking, the time spans of those programmes overlap. Recheck their programmed data.

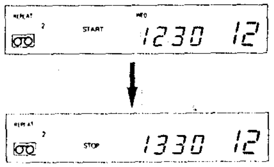
Note:

- The 1st week refers to the seven-day period from the present day and the 2nd week, to the following seven-day period (not weeks on the calendar). These two weeks are counted from the time of setting.



Reviewing the programmed data

- Press the PROGRAM button in the Timer Standby mode; the programmed data of the earliest-to-start programme will be shown for 6 seconds (3 seconds for START and 3 seconds for STOP) and then those of subsequent programmes, if any, in the same manner.



- If you wish to change the programmed data, engage the Timer Set mode (first press the TIMER button to disengage the Timer Standby mode and then press the PROGRAM button) and call up the corresponding programme number for reprogramming.

Timer recording operation

- When the preset start time is reached, recording starts.
- After timer recording, the power is switched off. If the tape end is reached during timer recording, the cassette is automatically ejected and the power is switched off.
- After all preset programmes have been executed, the Timer Standby mode is cancelled.

RECORDING FROM AN EXTERNAL SOURCE

By connecting an external video source (such as a VideoMovie camera-recorder, 2nd video recorder, video camera, etc.) to the VIDEO IN, AUDIO IN connectors, recording and/or editing are possible.

- For connection of these units, an appropriate cable is necessary.
- For connection of a video camera, a camera adapter is also necessary. Consult a JVC dealer.

1. Turn the power on for all connected equipment.
2. Adjust the TV receiver to your video channel.
3. Load a cassette.
4. Press either TV PROGRAM button ⑯ to obtain "AU" in the channel display.
5. Operate the source equipment properly.
6. Press REC/ITR ⑩.
7. To stop recording temporarily, press PAUSE/STILL ⑪.
8. To end recording, press STOP ⑧.

Note:

- For the operation of the source equipment, refer to the instruction manual of the relevant machine.

IN CASE OF DIFFICULTY

What may initially appear to be trouble is not always a real problem. Make sure first . . . .

Symptoms	Check points
No power is applied to the recorder.	• Is the power cord disconnected? Connect it.
Playback picture does not appear while the tape is running.	• Is the TV receiver's channel selector set to the correct video channel? Set to the RF converter channel.
Picture is normal but no sound.	• Is the SYSTEM select switch set to the appropriate position?
Tape does not run in the Record mode.	• Is the PAUSE/STILL button pressed? Press PLAY to release.
REC/ITR button cannot be engaged.	• Is the cassette improperly loaded? Load it properly. • Is the safety tab broken? Reseal the slot.
Tape stops in the Rewind or Fast Forward mode.	• Is the TAPE MEMORY switch set to COUNTER? Set to OFF.
Tape will not rewind.	• Is the tape already rewound to the end?
Noisy playback picture.	• Adjust with the TRACKING controls.
Pressing PAUSE/STILL during playback brings a still picture (in a frame-by-frame manner) with noise bars.	• Noise bars can be eliminated by pressing the PAUSE/STILL button a few more times.

This recorder contains microcomputers. External electronic noise or interference could cause malfunctioning. In such cases, switch the power off and unplug the power cord. Then plug it in again and check the functions.

HEAD CLEANING

- Picture playback may become blurred or interrupted while the TV programme received is clear. This does not mean that the recorded programme has been erased.
- Dirt accumulated on the video heads after long periods of use causes such problems. In this case, head cleaning requiring highly technical care is necessary.

For head cleaning, consult the nearest JVC dealer.

SECTION 1
MECHANISM ADJUSTMENT

1.1 GENERAL

1.1.1 Precautions

IMPORTANT:

1. Disconnect unit from power before removing or soldering components.
2. When removing a fastener (screw, washer, etc.), be careful not to drop it into the mechanism. If a fastener should be dropped, be sure to retrieve it.
3. The tape transport mechanism has been precisely adjusted at the factory and ordinarily does not require readjustment.
4. When removing a part, be very careful not to damage or displace other parts. (Be especially careful with the tape guides and rotary video head drum.)
5. For service procedures that call for operation of the set when the cassette housing is separated from the main-deck, perform as below.

1) Remove the cassette housing from the main-deck.
2) Disable the photo transistor sensor (END SENSOR) on the main-deck by applying an opaque cover.
3) The desired modes can be obtained by using the operation switches.

1.1.2 Required test equipment, fixtures and tools

For proper mechanical adjustment, the following test equipment, fixtures and tools are strongly recommended. Without them, a long trial-and-error period would be necessary resulting in possible damage. In addition, general-purpos tools are required.

1. Test equipment required:

Color television or monitor
Oscilloscope: Wide-band, dual trace, triggered, delaye sweep
Recording tape
Alignment tapes
Signal generator : PAL color bars, stairstep

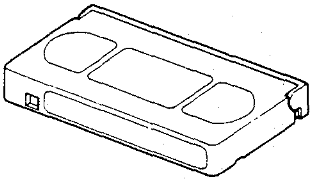
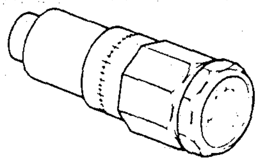
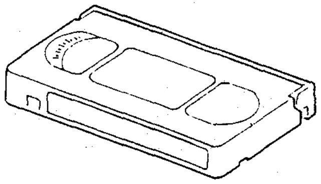
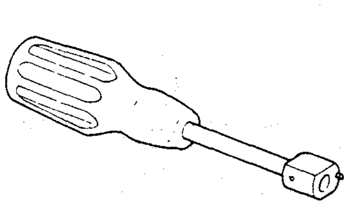
JVC alignment tape MH-2 	Torque gauge assembly PUJ48075-2 (Torquemeter : 600ATG Torquemeterhead : PUJ48016-2) 	Back tension cassette gauge PUJ48076-2 
A/CTL head position tool PUJ47351-2 		

Table 1-1-1 Fixtures and tools

1.1.3 Disassembly (external covers)

1. Top cover
1) Take out five screws from the right, left and rear sides of the set.
2) Tilt up the rear end of the top cover, then remove the top cover.

2. Bottom cover
1) Take out five screws from the bottom side of the set.
2) Set free the bottom cover from six claws of the chassis in order to remove the bottom cover.

3. Front panel assembly
1) Remove the top cover.
2) Bend three upper hooks of the front panel assembly upward in order to disengage them from their chassis retainers.
3) Disengage three lower hooks of the front panel assembly from their chassis retainers in order to remove the front panel assembly from the chassis.

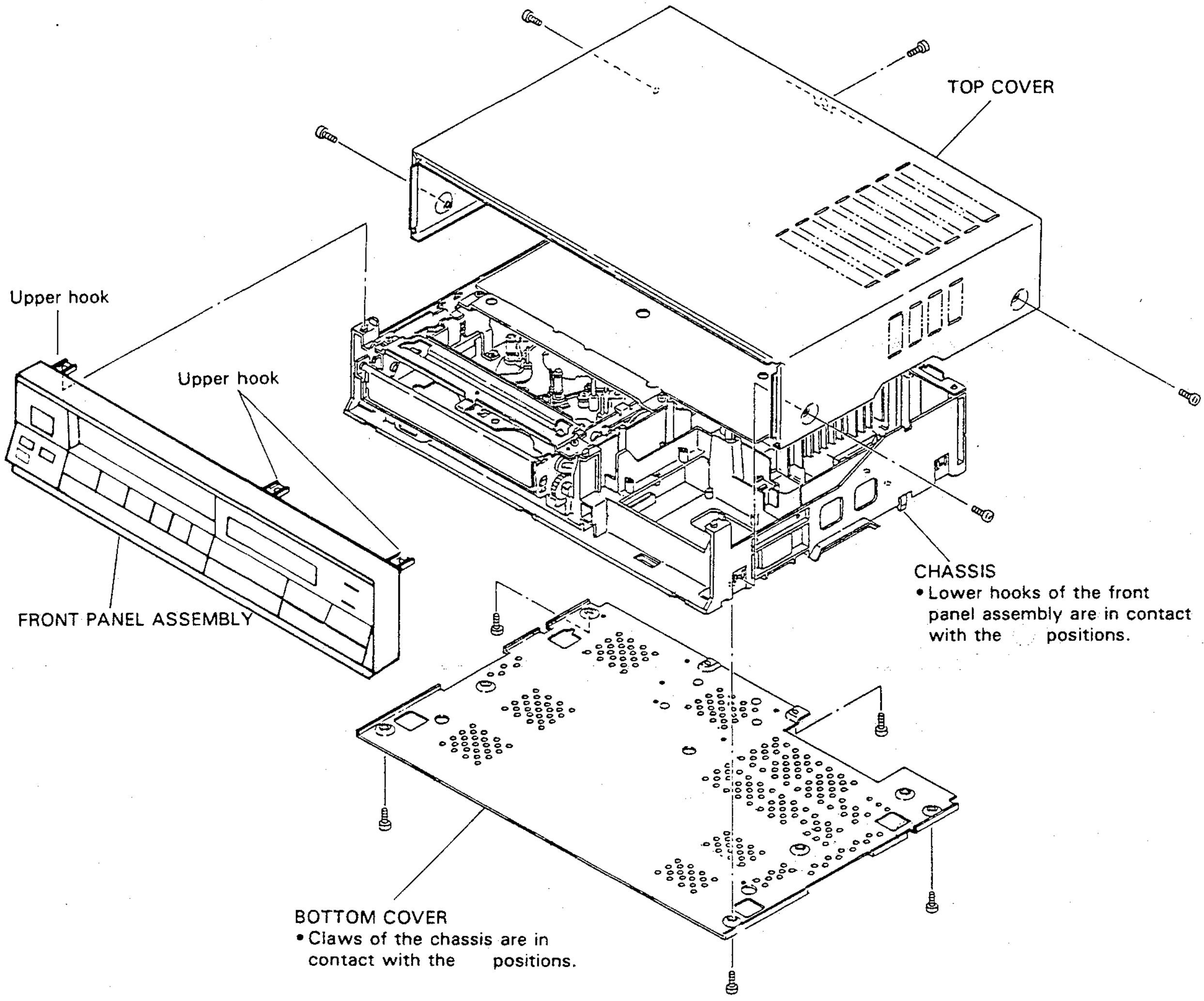

TOP COVER
Upper hook
Upper hook
FRONT PANEL ASSEMBLY
CHASSIS
• Lower hooks of the front panel assembly are in contact with the positions.
BOTTOM COVER
• Claws of the chassis are in contact with the positions.

Fig. 1-1-1 Removal of external covers

1.1.4 Layout of main parts

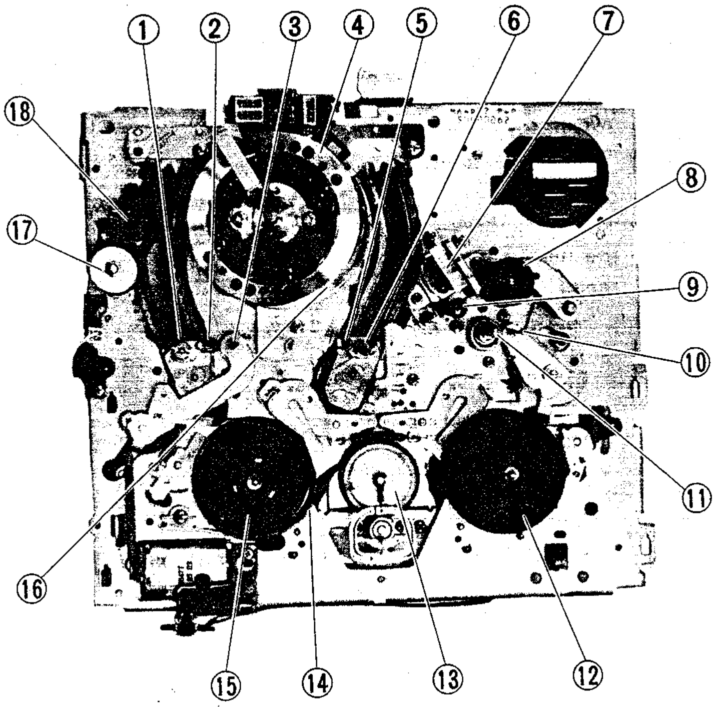


Fig. 1-1-2 Top view of main-deck

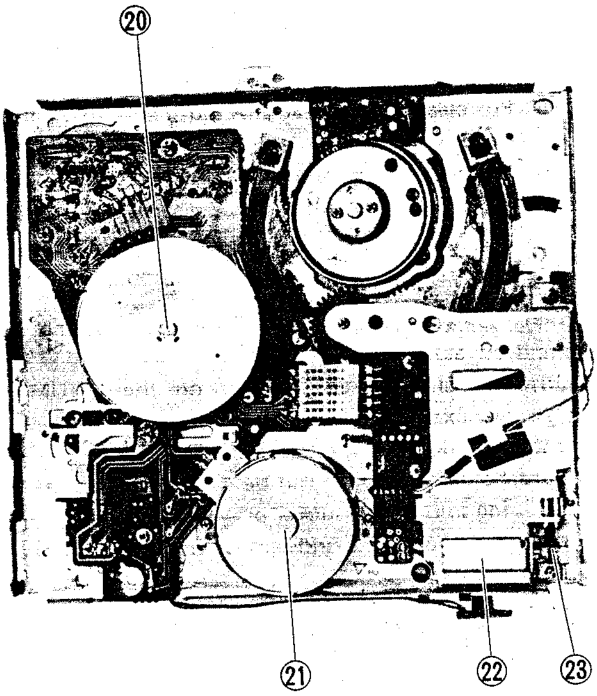


Fig. 1-1-3 Bottom view of main-deck

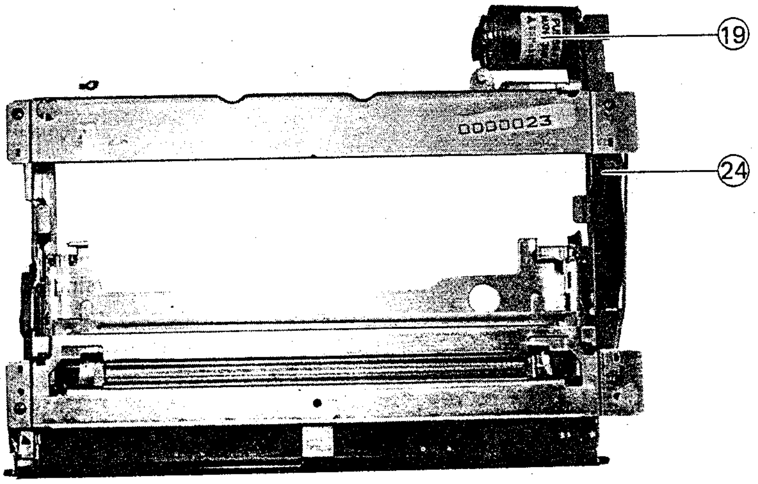


Fig. 1-1-4 Cassette housing

1. Supply guide roller
2. Supply slant pole
3. Tension pole
4. Upper drum
5. Take-up slant pole
6. Take-up guide roller
7. A/C head
8. Pinch roller
9. Take-up guide pole
10. Guide arm
11. Capstan
12. Take-up reel disk
13. Reel idler
14. Tension band
15. Supply reel disk
16. Lower drum
17. Impedance roller
18. Full erase head
19. Cassette motor
20. Capstan motor
21. Reel motor
22. Mode motor
23. Mode belt
24. Cassette belt

1.2 MAIN ASSEMBLY REPLACEMENT

1.2.1 Upper drum assembly

Notes: When handling and installing the upper drum assembly, avoid directly touching the head tips on the upper drum assembly.
For cleaning the head tips, push and hold a lint-free cloth or chamois dampened with alcohol to the upper drum assembly by the fingers, then turn the upper drum assembly clockwise. Do not clean the upper drum assembly with a vertical stroke.

1. Removal
1) Take out a screw and remove the brush assembly from the drum assembly.
2) Unsolder all soldered portions on the DRUM PWB. Remove excess solder, then remove the DRUM PWB from the upper drum assembly.
Note: Soldered portion can be easily removed by removing solder with sucker or wick.
3) Take out two screws and remove the upper drum assembly upwards.

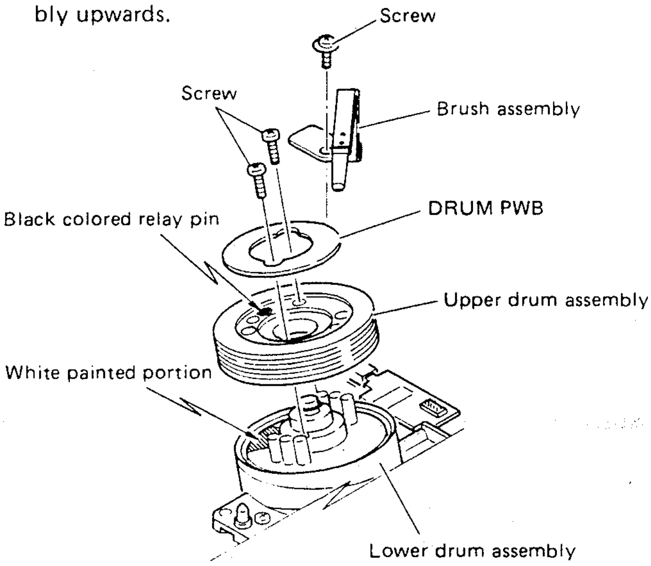


Fig. 1-2-1 Upper drum assembly

2. Installation
1) Install a new upper drum assembly so that the black-colored relay pin of the upper drum assembly overlies the white painted portion of the lower drum assembly, as shown in Fig. 1-2-1.
2) Tighten two screws in a balanced manner.
3) Set the DRUM PWB on the upper drum assembly, then resolder it.
4) Clean the drum unit (particularly clean the upper drum assembly).
5) Mount the brush assembly on the original position, then tighten a screw to fix the brush assembly.

3. Confirmation and adjustment
1) Perform the interchangeability confirmation. Refer to section 1.6.
2) Perform the PB switching point adjustment of the Servo (MAIN PWB) circuit. Refer to section 2.2.1.

1.2.2 A/C head (Audio/control head)

1. Removal
1) Disconnect connectors from the A/C HEAD PWB.
2) Take out two screws, then remove the A/C head and the head base together.
3) Unsolder and separate the A/C HEAD PWB from the A/C head.
4) Take out a screw and remove the shield cap from the A/C head.
5) Take out three screws and separate the A/C head from the head base. Use care regarding springs. Do not lose them.

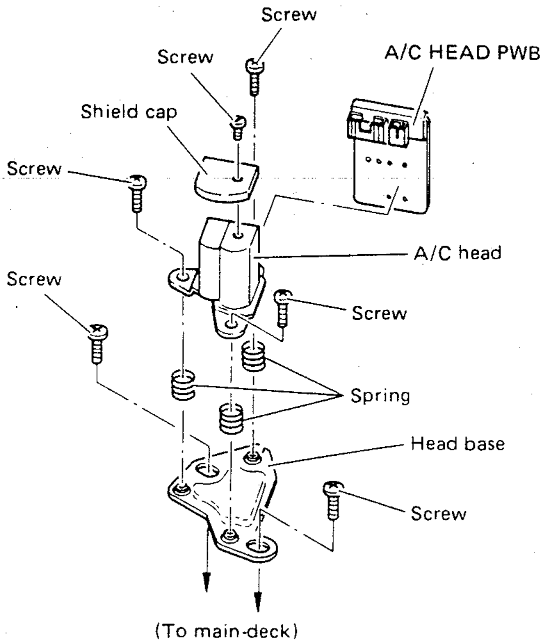


Fig. 1-2-2 A/C head

2. Installation
1) Mount a new A/C head and other peripheral parts on the main-deck by reversing the removal procedure.
2) Before installing the A/C head on the main-deck, perform rough-adjustment of A/C head height as shown in Fig. 1-2-3.

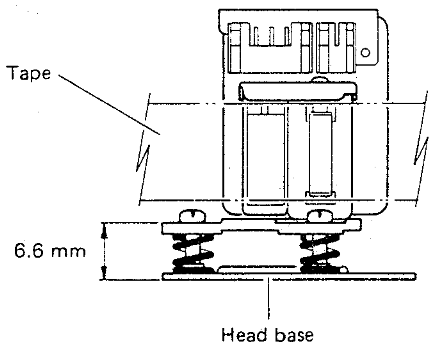


Fig. 1-2-3 A/C head height

3. Confirmation and adjustment
1) Use a recording tape and confirm correct tape transport operation, then perform interchangeability adjustment. Refer to sections 1.5 and 1.6.
2) Perform overall confirmation of the Audio circuit. Refer to section 2.4.

1.2.3 Tension band assembly

1. Removal
1) Take out a screw, then pry the A portion of the tension band assembly upwards to separate it from the tension arm assembly.

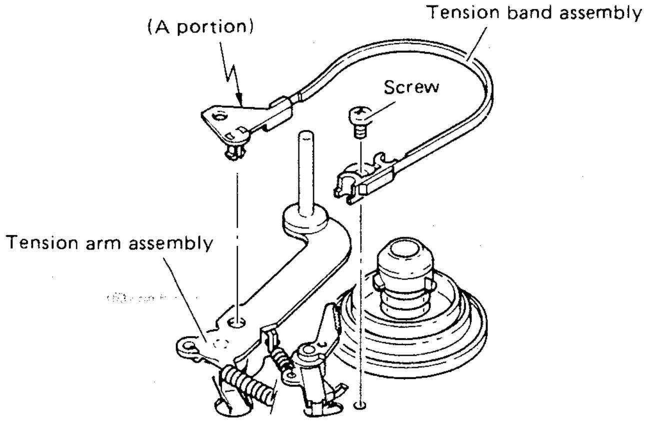

(A portion)
Tension band assembly
Screw
Tension arm assembly

Fig. 1-2-4 Tension band assembly

2. Installation
1) Install a new tension band assembly by reversing the removal procedure.

3. Confirmation and adjustment
1) Perform tension pole position adjustment. Refer to section 1.4.1.

1.3 ASSEMBLY PROCEDURE OF MECHANISM

The mechanism of this model is mostly engaged to the mechanism control circuit, through the mode select switch. Therefore, the relation between the mode select switch and the control arm decides all mechanical movement of the mechanical parts such as levers, gears, rollers and so on. If these parts are not properly positioned, the unit will be unloaded or compulsorily stopped. This will result in damage of mechanical or electrical parts.

1.3.1 Loading arm assembly

Loading arm assembly consists of loading gear, torsion spring and loading arm.

1. Set up the loading arm assembly correctly as shown in Fig. 1-3-1.

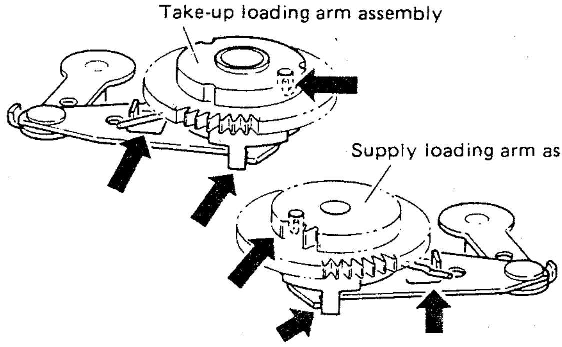

Take-up loading arm assembly
Supply loading arm assembly

Fig. 1-3-1 Loading arm assembly (1)

2. Install the take-up loading arm assembly and the supply loading arm assembly so that the holes on the loading gears face each other, as shown in Fig. 1-3-2. Do not move the loading arm assemblies from this position for the next step.

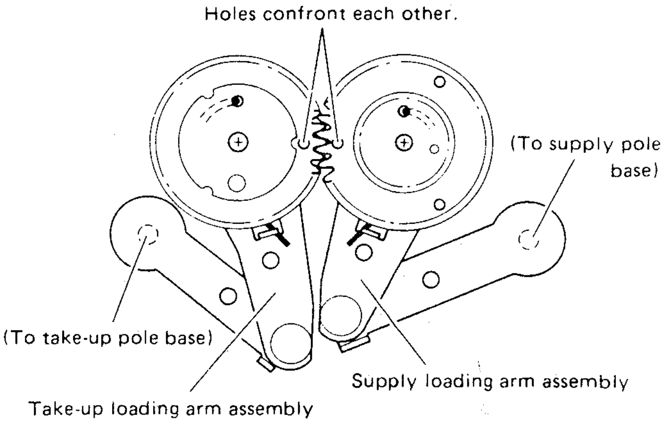

Holes confront each other.
(To supply pole base)
(To take-up pole base)
Supply loading arm assembly
Take-up loading arm assembly

Fig. 1-3-2 Loading arm assembly (2)

1.3.2 Control cam

1. Set the arm gear assembly on the cam bracket assembly so that the hole of the arm gear assembly overlaps the hole of the cam bracket assembly.
2. Install the control cam on the cam bracket assembly so that the hole of the control cam overlaps the hole which is indicated in the step 1), as shown in Fig. 1-3-3. Do not turn the control cam from this position for the next step.

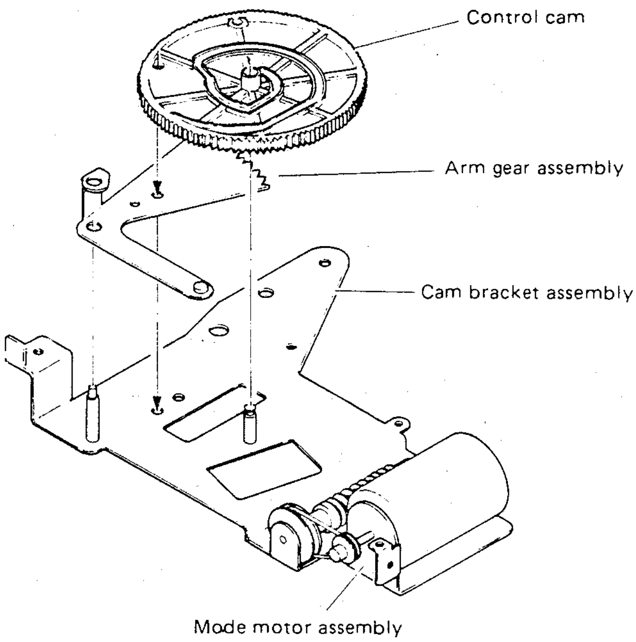
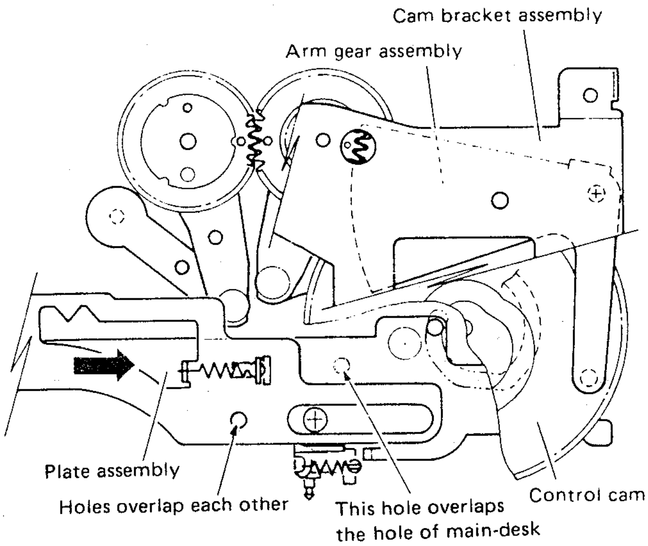

Control cam
Arm gear assembly
Cam bracket assembly
Mode motor assembly

Fig. 1-3-3 Control cam

1.3.3 Cam bracket assembly

1. Push and hold the plate assembly so that the hole of the plate assembly overlaps the hole of the main-deck, as shown in Fig. 1-3-4.
2. Then mount the cam bracket assembly.



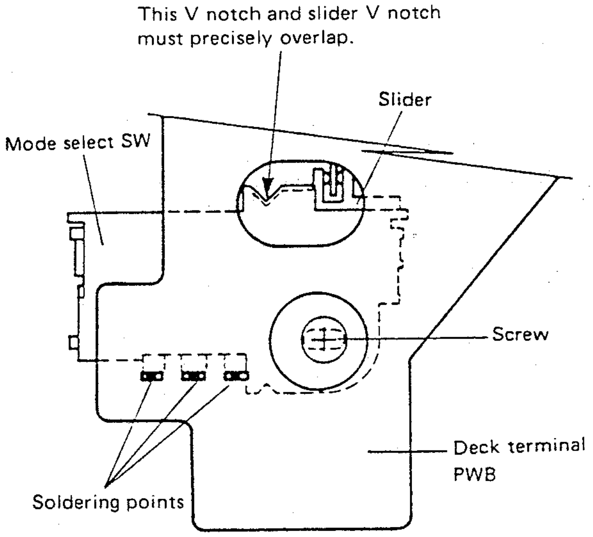
Cam bracket assembly
Arm gear assembly
Plate assembly
Holes overlap each other
This hole overlaps the hole of main-desk
Control cam

Fig. 1-3-4 Cam bracket assembly

Note: In order to overlap the holes turn the control cam fully counter clockwise by turning the mode motor with a finger.

1.3.4 Mode select switch

1. When the hole of the plate assembly overlaps the hole of main-desk, refer to Fig.1-3-4, confirm that the V-cut of the slider section just overlaps the V-cut of the outer section of the mode select switch.
2. If a difference of more than 0.5 mm is noticed, adjust the mode select switch to the correct position, after unsoldering and loosening the screw.



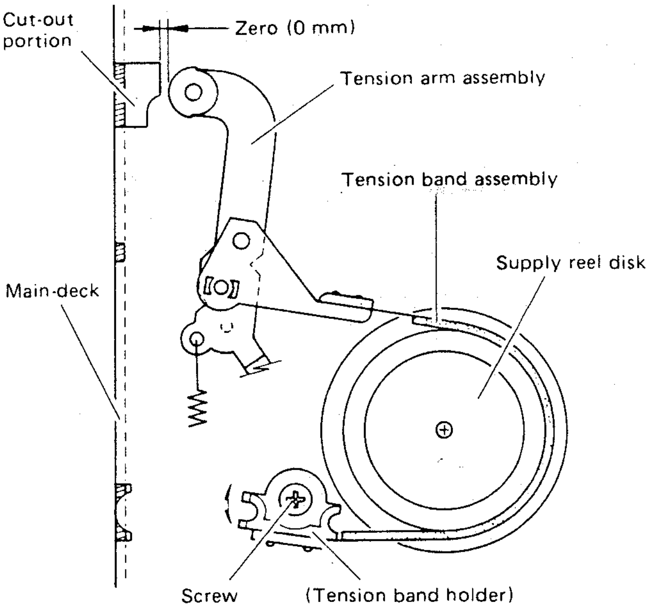
This V notch and slider V notch must precisely overlap.
Slider
Mode select SW
Screw
Deck terminal PWB
Soldering points

Fig. 1-3-5 Mode select switch

1.4 CONFIRMATION AND ADJUSTMENT

1.4.1 Tension pole position adjustment

1. Without loading a tape, set for the Play mode.
2. Loosen screw a little bit, then adjust the tension band holder so that the distance, shown in Fig. 1-4-1, becomes zero (0 mm).
3. Tighten screw to fix the tension band holder.



Cut-out portion
Zero (0 mm)
Tension arm assembly
Tension band assembly
Supply reel disk
Main-deck
Screw
(Tension band holder)

Fig. 1-4-1 Tension pole position

Note: By this adjustment, back tension is within normal specification, in spite of parts tolerances.

4. Use the back tension cassette gauge and set for the Play mode.
5. Confirm that the indication is between 25 – 75.

1.4.2 Take-up torque confirmation

1. Set the Play mode without the cassette housing assembly.
2. Set the torque gauge on the take-up reel disk.
3. The torque gauge consists of upper and lower sections connected by a spring mechanism. Relax the grip on the torque gauge so that the indicator needle and scale rotate at equal speed, then read the indication. The correct value is between 45 – 155.
4. If necessary, replace the take-up and supply clutches.

1.5 TAPE TRANSPORT SYSTEM CONFIRMATION AND ADJUSTMENT

Once adjusted to the complete condition, readjustment of the tape transport system is not necessary, except when the parts that compose the tape transport system are replaced due to troubles by long usage or unexpected accidents.

1.5.1 Tape transport system adjustment

1. Guide roller

   To get the FM envelope into ideal shape for interchangeability, the height adjustment of the guide roller is needed.

   Before turning the guide roller, slightly loosen the setscrew located under the guide roller. For loosening the setscrew, use the hex key (1.25 mm).

   Note: Loosen the setscrew enough to allow the guide roller to be turned. If excessively loose, tape motion may turn the guide roller inadvertently.

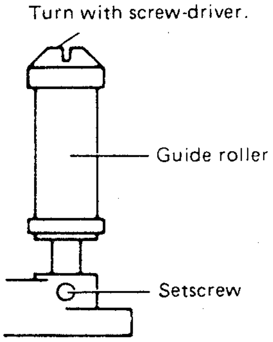

Turn with screw-driver.
Guide roller
Setscrew

Fig. 1-5-1 Guide roller

2. Impedance roller

   Normally, do not adjust the height of the impedance roller. Only when the defects of tape travel are noted at the impedance roller, after complete adjustment for interchangeability, adjust the height of impedance roller to obtain smooth tape travel. For adjustment of impedance roller height, use the nut-driver (5.5 mm).

   Note: Do not lower the impedance roller excessively to avoid the defects of tape travel. Tape must be along the lower flange located under the impedance roller.

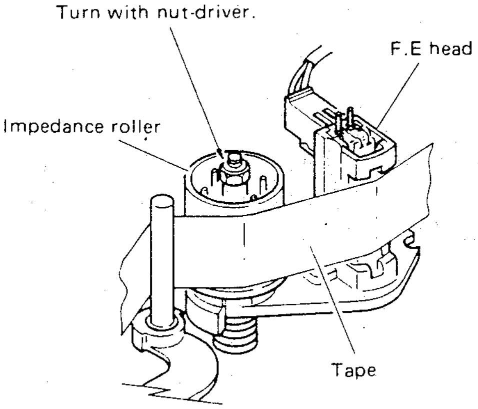

Turn with nut-driver.
F.E head
Impedance roller
Tape

Fig. 1-5-2 Impedance roller

3. A/C head (audio/control head)

   When defects of tape travel are noted at the take-up guide pole, adjust the inclination of A/C head to obtain smooth tape travel.

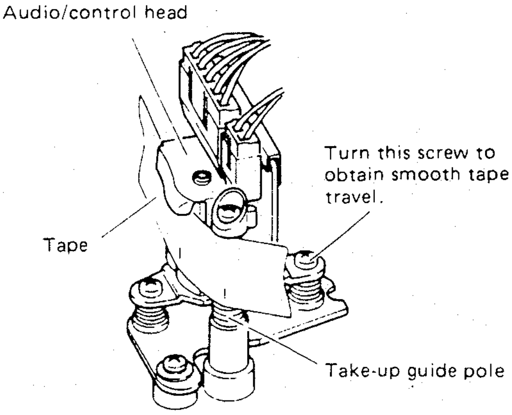

Audio/control head
Turn this screw to obtain smooth tape travel.
Tape
Take-up guide pole

Fig. 1-5-3 A/C head

1.6 INTERCHANGEABILITY CONFIRMATION AND ADJUSTMENT

Before using an alignment tape, use a recording tape and confirm correct tape transport operation.
For the FM envelope output, connect an oscilloscope to TP106 of the MAIN PWB. For audio output, connect to the AUDIO OUT terminal, and trigger the oscilloscope externally with the signal from TP411 of the MAIN PWB. Use only the stairstep segment of the alignment tape, do not use another segment for interchangeability.

1.6.1 FM envelope confirmation and adjustment

1. Push the TRACKING +/– buttons to obtain the maximum FM envelope output corresponding to (a) level in Fig. 1-6-1. Observe the FM envelope, read the maximum level (a) and the minimum levels (b), (c) and (d).
   Confirm that:

$$\frac{b}{a} \geq 0.7 \,,\ \frac{c}{a} \geq 0.5 \text{ and } \frac{d}{a} \geq 0.5$$

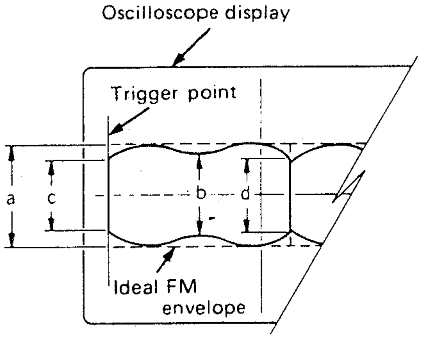


Fig. 1-6-1 FM envelope

2. If defects are noted, following adjustments are required.

1) Observe the oscilloscope display and push the TRACKING +/– buttons to vary the FM output from maximum to minimum.
2) If the variation is not parallel at the rising portion (drum entrance) of the FM envelope, turn the supply guide roller so that the rising portion of the envelope becomes nearly flat, as shown in Fig. 1-6-2.

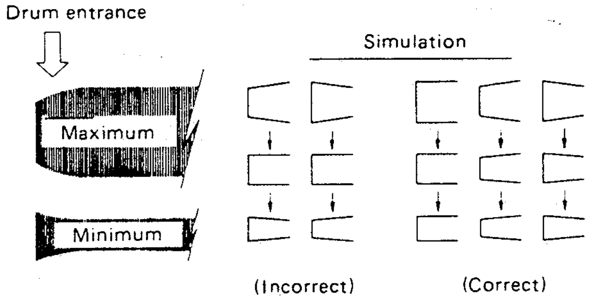


Fig. 1-6-2 Drum entrance

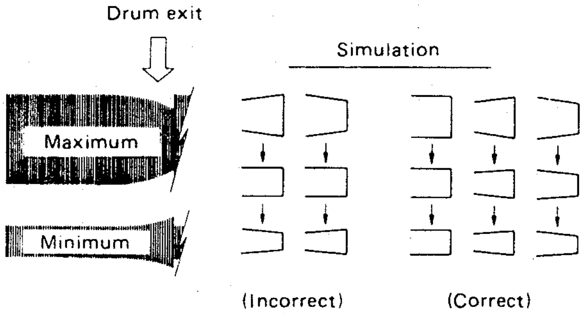


Fig. 1-6-3 Drum exit

3) In the same manner as for the rising portion, turn the take-up guide roller to adjust the falling portion (drum exit) of the FM envelope. See Fig. 1-6-3.
4) In addition to observing the envelope, confirm absence of tape curling or wrinkling at the impedance roller and take-up guide pole. If it occurs at the impedance roller, adjust the impedance roller height. If it occurs at the take-up guide pole, adjust the A/C head inclination.
5) Vary the FM envelope output level and perform fine adjustments of the guide rollers.

1.6.2 A/C head height and azimuth adjustments

Incorrect A/C head height can impair audio signal-to-noise ratio when playing back a pre-recorded tape.

1. For A/C head inclination, adjust screw (A) so that small tape wrinkles are not produced at the take-up guide pole. Turn screw (A) clockwise so that the tape wrinkles are apparent with the lower flange of the take-up guide pole, then turn screw (A) counter-clockwise so that the wrinkles smooth out.
2. Adjust azimuth with screw (B).
   Turn screw (B) to obtain maximum audio output.
3. For A/C head height, turn screws (A), (B) and (C) in succession by small and equal increments at a time and adjust for maximum audio output level.

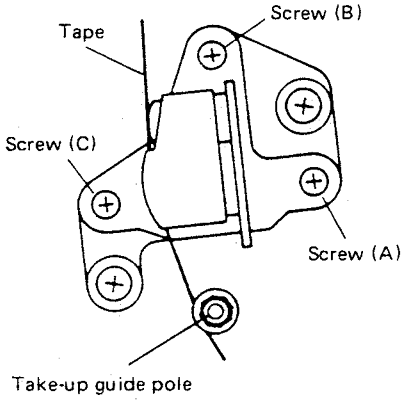


Fig. 1-6-4 A/C head

1.6.3 Control head phase adjustment

1. Set Tracking to Pre-Set Position by pushing both + button and – button at the same time.
2. Loosen screws (D) and (E) a little bit, then cover screw (D) with the A/CTL head position tool and set the pin of the tool into the hole next to screw (D).
3. Turn the tool counter-clockwise to shift the A/C head fully in the direction of the capstan, and then gradually turn the tool clockwise and observe the FM envelope output.
4. Set the A/C head at the point of the first output peak.

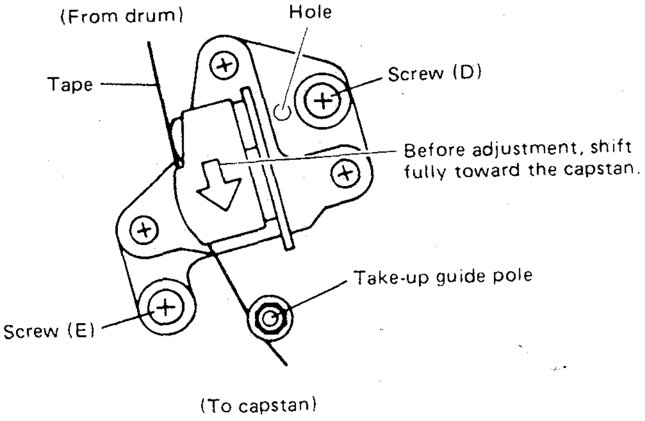


Fig. 1-6-5 Control head phase

1.6.4 Setscrew tightening

1. After confirming absence of tape wrinkling and other transport irregularities, tighten the setscrews located under the guide rollers while in the Stop mode.

   Note: Since the guide rollers are easily moved, use care when tightening.
2. Again perform the FM envelope confirmation.

1.6.5 Final confirmation

1. Supply a video signal and perform recording, then play back.

   Confirm that the FM envelope satisfies the specifications during playback of alignment tape MH-2.
2. Perform the PB switching point adjustment of the Servo circuit. Refer to section 2.2.1.
3. Perform the audio PB level adjustment of the Audio circuit. Refer to section 2.4.2.
4. Perform overall confirmation of the Video circuit. Refer to section 2.3.

SECTION 2
ELECTRICAL ADJUSTMENTS

2.1 PREPARATION

Electrical adjustments are required after replacing circuit components and certain mechanical parts.
It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

2.1.1 Required test equipment

1. Colour television or monitor
2. Oscilloscope: wide-band, dual-trace, triggered delayed sweep
3. Frequency counter
4. Audio oscillator
5. Audio voltmeter
6. Digital voltmeter
7. Signal generator: RF/IF sweep/marker
8. Signal generator: PAL colour bar, stairstep
9. Recording tape
10. Alignment tape: (MH-2)

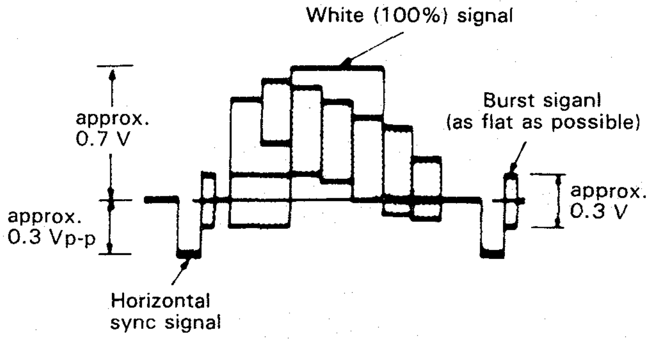

White (100%) signal
approx.
0.7 V
Burst siganl
(as flat as possible)
approx.
0.3 V
approx.
0.3 Vp-p
Horizontal
sync signal

Fig. 2-1-1 Colour bar signal of pattern generator

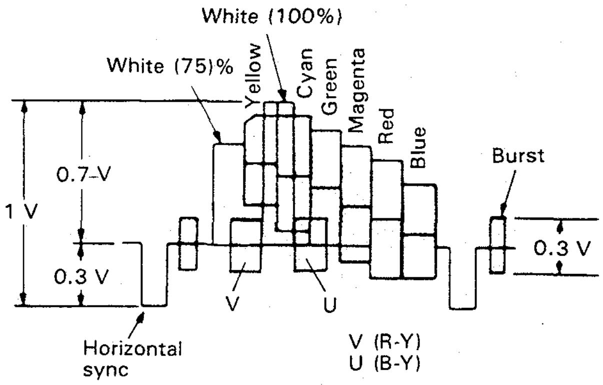

White (100%)
White (75)%
Yellow
Cyan
Green
Magenta
Red
Blue
Burst
0.7-V
1 V
0.3 V
0.3 V
V
U
Horizontal
sync
V (R-Y)
U (B-Y)

Fig. 2-1-2 Colour bar signal waveform

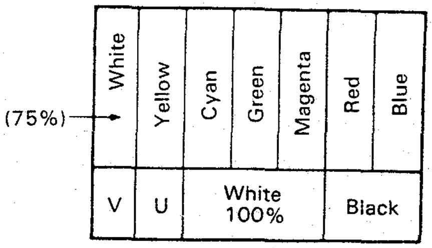

(75%)
White
Yellow
Cyan
Green
Magenta
Red
Blue
V
U
White
100%
Black

Fig. 2-1-3 Colour bar pattern

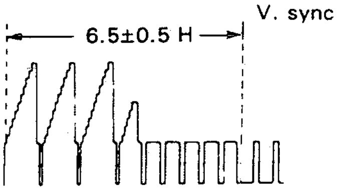
2.1.2 Check and adjustment steps

The check and adjustment steps are provided in the following in the form of charts. For clarity, the nomenclature used in the charts is outlined below.

No.	Checks and adjustments are numbered in the recommended sequence in which they are to be performed.
Item	Name assigned to the particular check and adjustment step.
Check Point	Location to which measuring instrument (oscilloscope unless otherwise noted) is to be connected.
Adjustment Parts	Variable component (resistor, capacitor, etc.) to be adjusted in this step. Dash (—) indicates check only.
Signal & Mode	• Input signal required to perform adjustment. Dash (—) indicates that special signal is not required. • Equipment operating mode at time of check or adjustment.
• Colour bar	Colour bar signal as video input.
• Stairstep	Stairstep signal as video input.
• 1 kHz	Supply a 1 kHz sinewave as audio input signal.
• MH-2 Colour bar	Play colour bar segment of MH-2 alignment tape.
• MH-2 Stairstep	Play stairstep segment of MH-2 alignment tape.
• MH-2 1 kHz	Play 1 kHz audio signal segment of MH-2 alignment tape.
• MH-2 RF sweep	Play RF sweep segment of MH-2 alignment tape.
• E-E	Power on and machine in Stop mode.
• REC	Recording mode
• PB	Playback mode
• REC then (another mode)	Use blank tape, record, then play back in the mode specified.
• SEARCH	Search (FWDS and REVS) playback mode.
• SLOW	Slow motion playback mode.
• STILL	Play back then Pause.
• A DUB	Audio dubbing mode.
Description	This column provides an explanation of the step, notes, adjustment values.

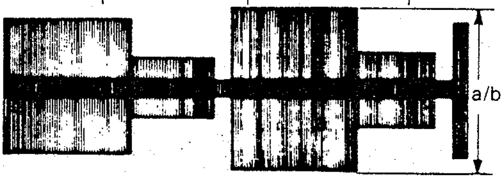
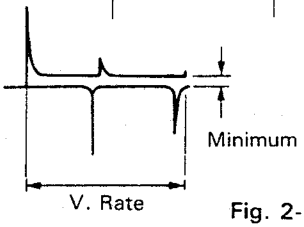
2.2 SERVO CIRCUIT

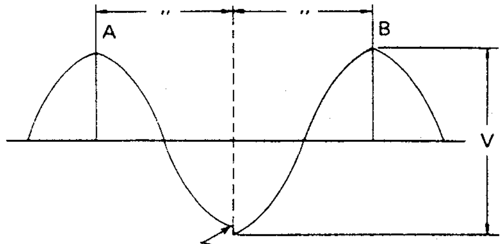
Note: Unless otherwise specified, all test points and adjustment parts are located on the MAIN board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	PB Switching Point	TP110 (VIDEO OUT)	R430 (PB SW POINT)	• PB • MH-2 Stairstep • Trigger slope (–)	1. Connect an oscilloscope to TP110. 2. Play back the stairstep segment of MH-2 alignment tape. 3. Trigger the oscilloscope externally (– slope) with the signal from TP411 (DRUM FF). 4. Adjust R430 to position the trigger point 6.5 ±0.5 H from V. sync.  Fig. 2-2-1
Note: Before this adjustment "Control head phase adjustment" must be completed. Refer to Section 1.6.3.					
2	V. Pulse Position	MONITOR	R434 (V-LOCK)	• REC then STILL • Colour bar	1. Record a colour bar signal, then play back. 2. In the Still mode, observe the monitor and adjust R434 (rear panel) for the minimum vertical jitter.

2.3 VIDEO CIRCUIT

Note: Unless otherwise specified, all test points and adjustment parts are located on the MAIN board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	VXO	TP209 (VXO)	R207 (VXO)	• PB • MH-2 Colour bar	1. Connect a frequency counter to TP209. 2. Play back the colour bar segment of MH-2 alignment tape. 3. Adjust R207 for 4.433619 MHz ± 50 Hz.
2	REC Color Level  Fig. 2-3-1	TP207 (PB COL)	R214 (REC COL LEV)	• Colour bar • REC then PB	1. Play back the colour bar signal of the MH-2 Alignment tape. 2. Connect an oscilloscope to TP207 and measure the colour play-back level. Make a note of this as level "a". 3. Use a spare tape to record and play back a colour bar signal. Make a note of this play-back level as level "b". 4. So that the ratio of b/a becomes 0.85±0.05, adjust R214 during recording. 5. Confirm that the channel difference is within ±3 dB.
3	Noise cancel balance	TP121 (NC BAL)  Fig. 2-3-2	R112 (YNR NC BAL)	• Colour bar • REC then PB	1. Record, then play back a colour bar signal and connect an oscilloscope to TP121. 2. As indicated in the figure, adjust R112 for minimum DC step difference.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
4	SECAM DET	TP251 (S DET ADJ)	L251 (1/2 fH TUNING)	• SECAM colour bar • E-E	1. Connect an oscilloscape to TP251. 2. Adjust L251 so that the transition step becomes centered between "A" and "B" as shown in Fig. 2-3-3.  Set this point to center position between points "A" and "B". V = more than 5.5 Vp-p in REC V = 6.0±0.5 Vp-p in PB **Fig. 2-3-3**
		TP214 (SECAM DET)	R257 (SECAM DET. ADJ)	• SECAM colour bar • REC then PB	3. Connect an oscilloscope to TP214. 4. Record, then play back a SECAM colour bar signal. 5. Adjust R257 for 6.0 ±0.5 Vp-p.
5	PB Frequency Response	MONITOR	R127 (PB FREQ RESPONSE)	• REC then PB • TV Broadcast	1. Record, then play back a colour broadcast that shows a good depiction of human facial contours. 2. Adjust R127 to obtain distinct facial features on the monitor.

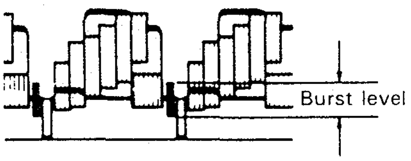
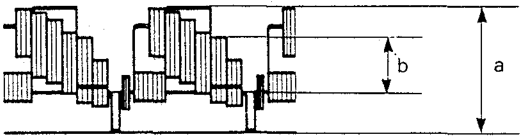
2.4 AUDIO CIRCUIT

Note: Unless otherwise specified, all test points and adjustment parts are located on the MAIN board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Audio Bias Level	TP31, TP32 (BIAS LEVEL)	R41 (BIAS ADJ)	• REC	1. Connect a digital voltmeter between TP31 and TP32. 2. Set for REC mode without a signal. 3. Adjust R41 for 3.5 mV ± 0.2 mVrms.
2	Audio PB Level	AUDIO OUT	R33 (PB LEVEL)	• REC then PB	1. Connect an oscilloscope to AUDIO OUT. 2. Supply an audio signal (−8 dBs/1 kHz) to AUDIO IN and record together with a VIDEO signal, then play back. 3. Adjust R5 so that the audio output level during playback becomes −6 ± 1.0 dBs.

2.5 TUNER/IF CIRCUIT

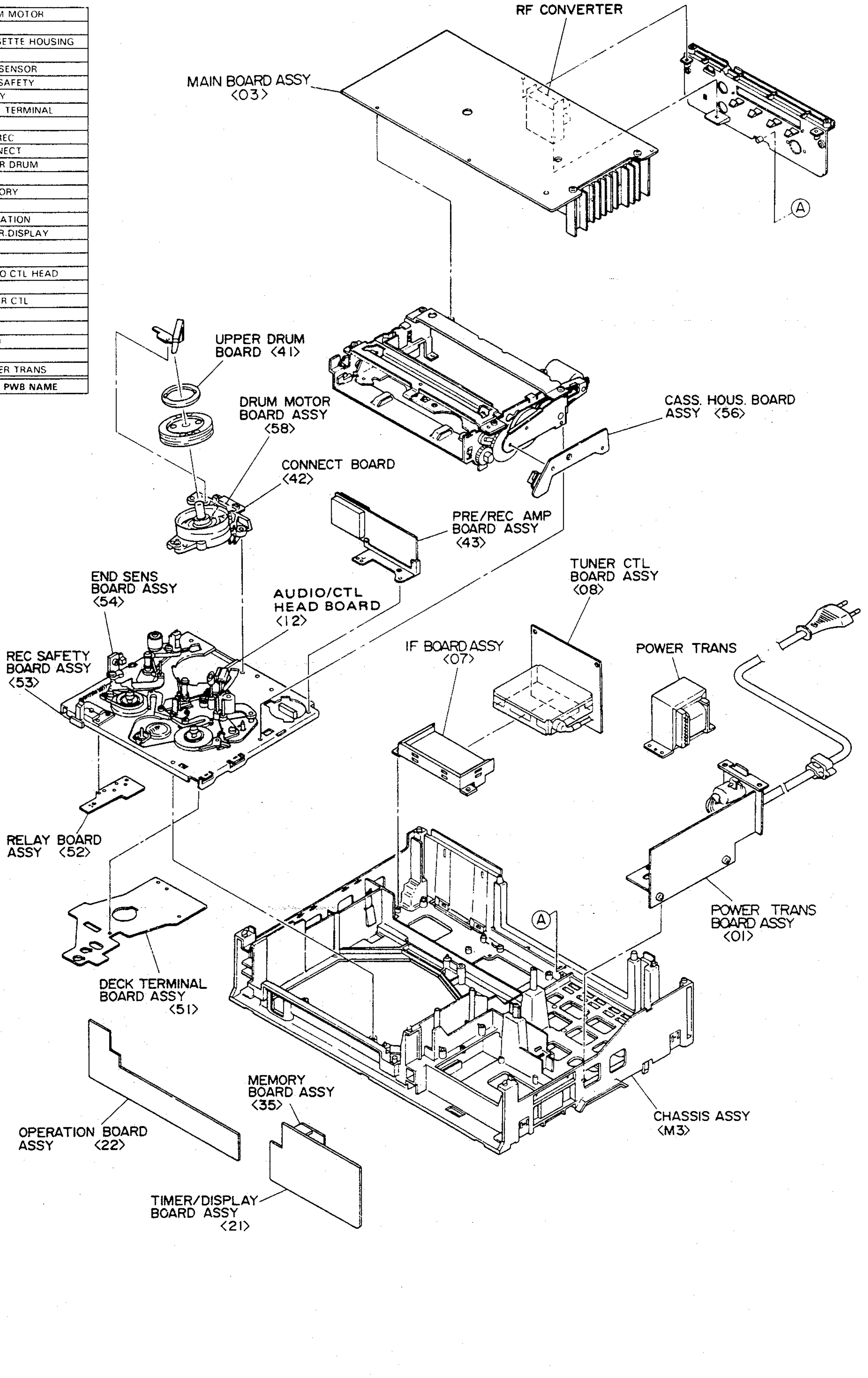
Note: Unless otherwise specified, all test points and adjustment parts are located on the IF board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	VCO	MONITOR	T1 (LLD)	• TV broadcast • Tuner mode	1. Receive a colour broadcast. 2. Adjust T1 to obtain a fine picture on the monitor.
2	AFC	MAIN board TP110 (VIDEO OUT)	T2 (AFC)	• TV broadcast • Tuner mode	1. Receive a colour broadcast. 2. With AFC SW to OFF, perform fine tuning. Then, precisely read the burst level of IC1-18. Make a note of the burst level. 3. When AFC SW is ON, adjust T2 (AFC) so that the burst level of IC1-18 becomes equal to the noted level as shown in Fig. 2-5-1.  Fig. 2-5-1
3	Color Level	MAIN board TP110 (VIDEO OUT)	R43 (COL LEV)	• TV broadcast • Tuner mode	1. Supply a colour bar signal from a TV channel signal generator and select the channel corresponding to the generator. 2. With AFC SW ON, adjust R43 to produce signal waveform as shown in Fig. 2-5-2. Alternate method 1. Receive a colour broadcast. 2. With AFC SW ON, adjust R43 so that the burst level becomes 2/3 of the sync level.  Y level = 1 Magneta level = 0.48 a : b = 1 : 0.48 Fig. 2-5-2
4	RF AGC	MONITOR	R18 (AGC)	• TV broadcast • Tuner mode	**Note:** Adjust R18 (RF AGC) to correct for excess noise in the picture or when streaky cross interference occurs due to strong electrical fields. 1. Adjust R18 to minimize noise or steaks on the TV screen. 2. Check for absence of abnormality on all channels.

SECTION 3
CHARTS AND DIAGRAMS

3.1 CIRCUIT BOARD LOCATIONS

NO.	PWB NAME
58	DRUM MOTOR
56	CASSETTE HOUSING
54	END SENSOR
53	REC SAFETY
52	RELAY
51	DECK TERMINAL
43	PRE/REC
42	CONNECT
41	UPPER DRUM
35	MEMORY
22	OPERATION
21	TIMER/DISPLAY
12	AUDIO CTL HEAD
08	TUNER CTL
07	IF
03	MAIN
01	POWER TRANS


RF CONVERTER
MAIN BOARD ASSY <03>
Ⓐ
UPPER DRUM BOARD <41>
DRUM MOTOR BOARD ASSY <58>
CASS. HOUS. BOARD ASSY <56>
CONNECT BOARD <42>
PRE/REC AMP BOARD ASSY <43>
END SENS BOARD ASSY <54>
AUDIO/CTL HEAD BOARD <12>
TUNER CTL BOARD ASSY <08>
REC SAFETY BOARD ASSY <53>
IF BOARD ASSY <07>
POWER TRANS
RELAY BOARD ASSY <52>
Ⓐ
POWER TRANS BOARD ASSY <01>
DECK TERMINAL BOARD ASSY <51>
MEMORY BOARD ASSY <35>
CHASSIS ASSY <M3>
OPERATION BOARD ASSY <22>
TIMER/DISPLAY BOARD ASSY <21>

3.2 GENERAL INFORMATIONS

3.2.1 Connections

Note:
Unless otherwise specified, only signal input flow is indicated.
Connection arrows indicate only signal outputs.

1 2 3 : Connector

① ② ③ : Direct connection

1 2 3 : Board in connector

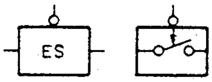
(VS) (MS) (SM) : Connected pattern in the board.

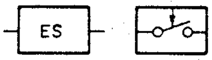
Abbreviations R : Regulator
V : Video M : Mechacon
S : Servo A : Audio

VS : Signal flow from video to servo.

3.2.2 Indications

AUX : Active only at high.
$\overline{\text{AUX}}$: Active only at low.
$\dot{\overline{\text{AUX}}}$: Active only at middle.
$\text{AU}\overline{\text{X}}$: Active only at open.


: Active only at low for electronic switch.


: Active only at high for electronic switch.

: Low pass filter.

: High pass filter.

: Band pass filter.

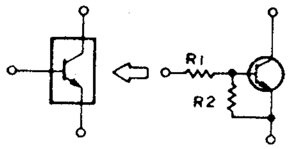
: Limiter.

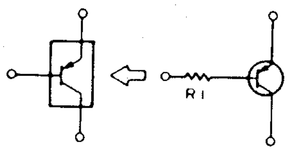
: Detector

: Amplifier.

: Mixer stage.

3.2.3 Digital transistor





DTA114T
T mark only

Note:
The digital transistor includes built in resistors.
It features small size and high reliability.
Both PNP and NPN types are available.

Uses:
Inverter, Interface, driver circuits.

3.2.4 Siganl flow in the schematic

➡ Recording signal path
⇨ Playback signal path
⇨ REC/PB signal path

3.2.5 Schematic diagram values

Unless otherwise specified.

1. All resistance values are in ohms, 1/6 W, 1/8 W, (refer to parts list).
2. All capacitance values are in µF, (P; PF).
3. All inductance values are in µH, (m; mH).
4. All diodes are 1SS133 or MA165, (refer to parts list).
5. Voltages are DC-measured (reference to ground) with a digital voltmeter during recording (SP mode) and playback (SP mode) with alignment tape. Where voltages differ between recording and playback, the voltage during playback is shown in parentheses.
6. Waveforms (VIDEO System) are measured (reference to ground) with a color bar during recording (SP mode) and playback (SP mode) with alignment tape.
7. Waveforms (AUDIO System) are measured (reference to ground) with 1 kHz (−8 dBs) during recording and playback with alignment tape (1 kHz).
8. Shaded (▒) parts are critical for safety.
Replace only with specified parts numbers.

3.3 ABBREVIATIONS USED IN THE SCHEMATIC DIAGRAM

A
AC : Alternating Current
ACC : Automatic Color Control
ACCEL : Acceleration
A/CTL : Audio/Control
ADC : Analog to Digital Converter
ADD : Adder
ADRS : Address
ADJ : Adjustment
A DUB : Audio Dubbing
AE : Audio Erase
AEF : Automatic Editing Function
AFC : Automatic Frequency Control
AFT : Automatic Fine Tuning
AGC : Automatic Gain Control
AH : Audio Head
AL : After Loading
ALC : Automatic Light Compensation
Automatic Level Control
AM : Amplitude Modulation
AMP : Amplifier
ANT : Antenna
APC : Automatic Pedestal Control
Automatic Phase Control
APL : Average Picture Level
A/S/M : Audio/Servo/Mechacon
ASS'Y : Assembly
ATT : Attenuator
AUD : Audio
AUTO : Automatic
AUX : Auxiliary

B
B : Base
BAL : Balance
BATT : Battery
BFP : Burst Flag Pulse
BIT : Binary Digit
BLK : Black, Blanking
BLU : Blue
BILING : Bilingual
BPF : Bandpass Filter
BRK : Brake
BRN : Brown
BT : Band Tuning
BUFF : Buffer
BW or B/W : Black and White

C
C : Capacitance, Collector, Color
CAP : Capstan, Capacitor
CAR : Carrier
CARR : Carrier
CASS : Cassette
CCD : Charge Coupled Device
CCT : Circuit
CD : Count Down
CE : Chip Enable
CF : Ceramic Filter
CH : Channel
CHG : Charge
CHROMA : Chrominance
CLK : Clock
CLR : Clear
CMD : Command
CNT : Count, Counter
COL : Color
COM : Common
COMB : Combination
Comb Filter
COMP : Comparator
Composite
Compensation
CONN : Connector
CONV : Converter
CP : Circuit Protector
Clamp Pulse
CPC : Capstan Phase Control
CTL : Control

D
D : Drum, Digital, Diode, Drain
DAC : Digital to Analog Converter
dB : Decibel
DC : Direct Current
DEC : Decoder
DEMOD : Demodulator
DEMUX : Demultiplexer
DET : Detector
DEV : Deviation
DIF : Differential
DISCR : Discriminator
DL : Delay Line
DOC : Dropout Compensator
DOD : Drop Out Detector
DPC : Drum Phase Control

E
E : Edit, Emitter
E-E : Electric to Electric
EF : Emitter-Follower
EMP : Emphasis
EN : Enable
ENC : Encoder
ENV : Envelope
EP : Extended Play
EQ : Equalizer
ES : Electronic Switch
ESNS : End Sensor
EXP : Expander
EXT : External

F
F : Farad, Fuse
F ADV : Frame Advance
FDP : Fluorescent Display Panel
FE : Full Erase
FET : Field Effect Transistor
FF : Fast Forward
Flipflop
FG : Frequency Generator
FM : Frequency Modulation
FMA : FM Audio
FR : Full Recording, Frame, Fusible Resistor
FREQ : Frequency
F-V CONV : Frequency to Voltage Converter
FWD : Forward
FWD S : Forward Search

G
G : Green, Gate, Grid
GEN : Generator
GND : Ground
GRN : Green
GRY : Gray

H
H : High, Henry, Hour
HG : Hall Generator
HPF : Highpass Filter
Hz : Herz

I
IC : Integrated Circuit
ID : Identification (Pulse)
IF : Intermediate Frequency
IFR : Infrared
IFT : Intermediate Frequency Transformer
IND : Indicator
INH : Inhibit
INS : Insert
INT : Internal, Interrupt
INV : Inverter
I/O : Input/Output
IR : Infrared

L
L : Low, Left
LIM : Limiter
LIN : Linearity
LOAD : Loading (Cassette)
LP : Long Play
LPF : Lowpass Filter

M	M	: Motor, Mega
	MAX	: Maximum
	MDA	: Motor Drive Amplifier
	MECHACON	: Mechanism Control
	MIC	: Microphone
	MIN	: Minimum
	MIX	: Mixer, Mixing
	MMV	: Monostable Multivibrator
	MOD	: Modulation, Modulator
	MODEM	: Modulator-Demodulator
	MON	: Monitor
	MPX	: Multiplexer, Multiplex
	MS	: Mode Select
N	NAND	: Not-And
	NC	: Not Connected, Normally Closed
	NFB	: Negative Feedback
	NLN	: Non-Linear
	NO	: Normally Open
	NOR	: Normal, Not-Or
	NR	: Noise Reduction
O	OP	: Operation
	OPAMP	: Operational Amplifier
	ORN	: Orange
	OSC	: Oscillator
P	PB	: Playback
	PC	: Photocoupler, Pulse Counter
	PCM	: Pulse Code Modulation
	PG	: Pulse Generator
	PGM	: Program
	PI	: Photo Interrupter
	PIF	: Picture Intermediate Frequency
	PLA	: Programmable Logic Array
	PLL	: Phase Locked Loop
	POS	: Position
	p-p	: Peak-to-Peak
	PREAMP	: Preamplifier
	P/S	: Pause/Still
	PSC	: Pulse Swallowing Control
	PU	: Pickup
	PUT	: Programmable Unijunction Transistor
	PWM	: Pulse Width Modulation
	PWR	: Power
Q	Q	: Quality Factor
R	R	: Red, Right
	RA	: Resistor Array
	RAE	: Random Access Enable
	RAM	: Random Access Memory
	REC	: Recording
	REF	: Reference
	REG	: Regulated, Regulator
	REM	: Remote
	REMOCON	: Remote Control (Unit)
	REV	: Reverse
	REV S	: Reverse Search
	REW	: Rewind
	R/P	: Record/Playback
	RPT	: Repeat
	RST	: Reset
	RT.	: Rotary Transformer
	RUN	: Running
	RY	: Relay
S	SAW	: Sawtooth, Surface Acoustic Wave
	SC	: Subcarrier, Simulcast
	SCH	: Search
	SEL	: Select, Selector
	SENS	: Sensor
	SEP	: Separator
	SF	: Source Follower
	SFF	: Short Fast Forward
	SIF	: Sound Intermediate Frequency
	SHARP	: Sharpness
	SN	: Signal to Noise Ratio
	SOL	: Solenoid
	SP	: Standard Play
	SREV	: Search Reverse
	SREW	: Short Rewind
	S/S	: Slow/Still
	SSG	: Sync Signal Generator
	SSNS	: Start Sensor
	STD	: Strobe Data, Standard
	SUP	: Supply
	SW	: Switch
	SWD	: Switched
	SYNC	: Synchronization
T	TF	: Thermal Fuse
	TIM	: Timing
	TK	: Tracking
	TNR	: Tuner
	TP	: Test Point
	TPZD	: Trapezoid
	TR	: Transistor, Trimmer
	TRANS	: Transformer
	TU	: Take-up
U	UL	: Unloading
	UNREG	: Unregulated
	UNSW	: Unswitched
V	V	: Vertical, Volt
	VCO	: Voltage Controlled Oscillator
	VD	: Vertical Drive
	VIF	: Video Intermediate Frequency
	VLT	: Violet
	VR	: Variable Resistor
	VS	: Video and Sync
	V/T	: Video/Television
	V/U	: VHF/UHF
	VXO	: Variable Crystal Oscillator
W	W	: Watt
	W & D	: White and Dark
	WHT	: White
X	XTAL	: Crystal
Y	Y	: Luminance
	YEL	: Yellow

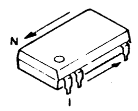
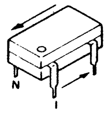
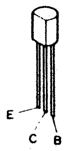
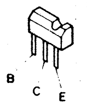
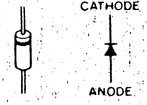
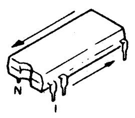
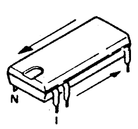
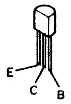
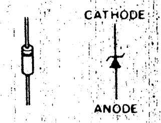
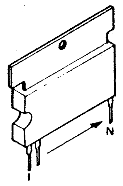
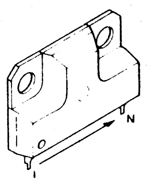
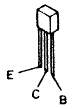
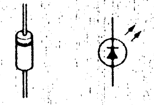
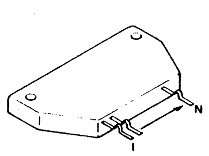
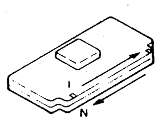
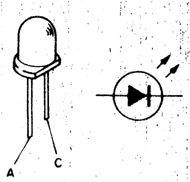
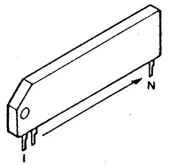
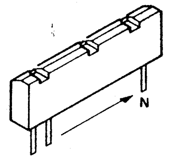
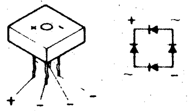
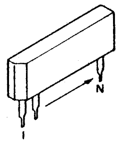
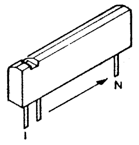
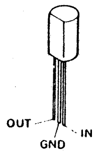
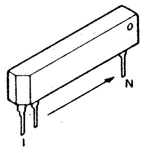
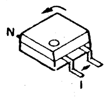
3.4 MAIN TYPES OF ACTIVE AND PACKAGE CIRCUITS

INTEGRATED CIRCUIT		
	NAME	L
A	AN3380K	2A
B	BA10358 BA6222 BA6259N BA7007 BA7751ALS	2B 3A 5B 5B 5A
G	GP1U501	
H	HD49712NT	1A
I	IC-PST523H-2	7A
L	LA7910	7B
M	MSM6967RS M50731-623SP M51496P M528L56 M54647L	8A 2B 2B 7A 3B
P	PB20166C PU22046A	4B 4B
S	STK5481	4A
T	TA7374P	6A
U	UPD75208CW-097	2A

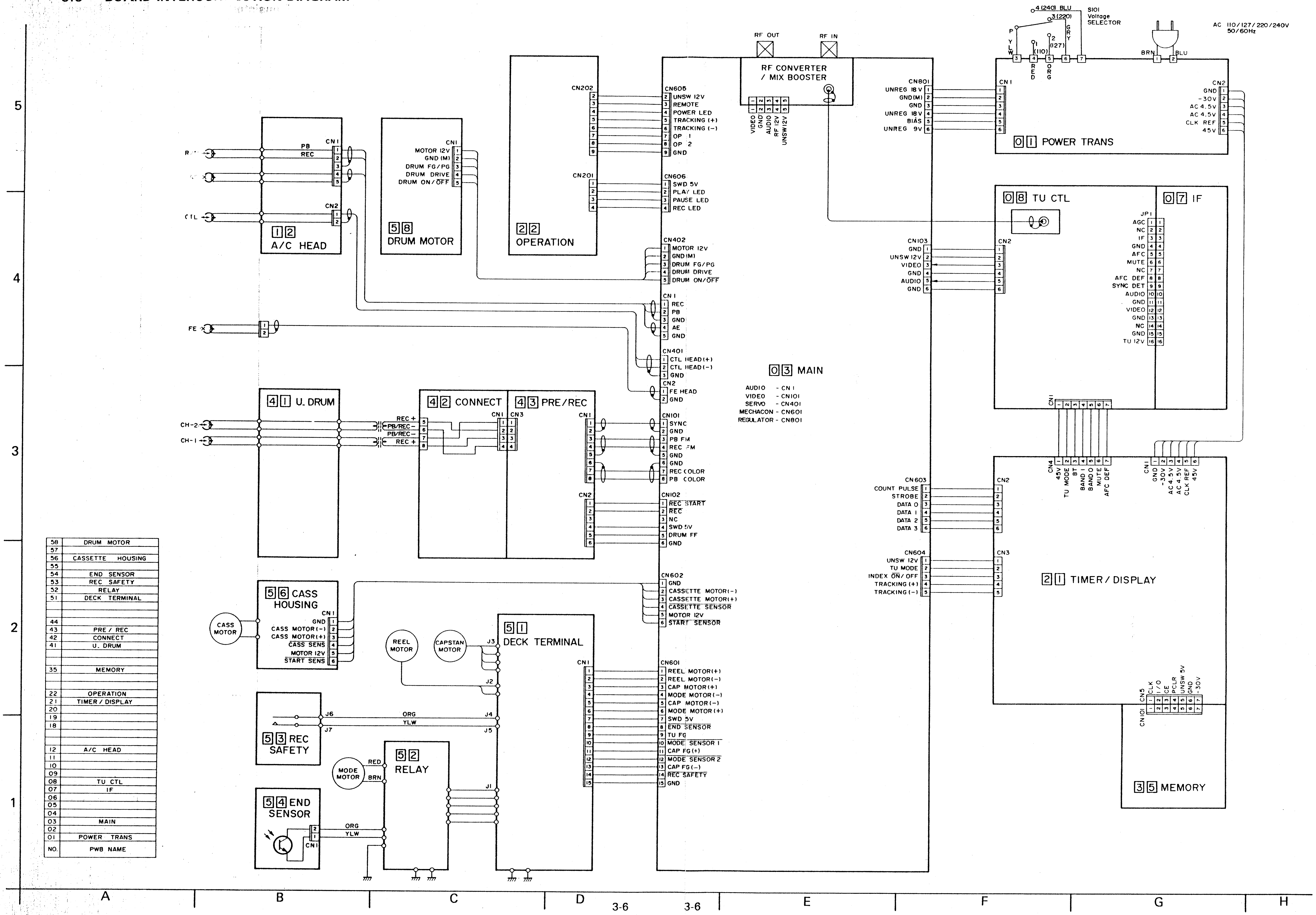
TRANSISTOR		
	NAME	L
D	DTA114ES DTA124ES DTC114YS DTC124ES DTC144ES DTC144WS DTC144YS	3C 3C 3C 3C 3C 3C 3C
P	PN268R	
2SA	2SA1309 2SA720 2SA933	3C 2C 3C
2SB	2SB810	3C
2SC	2SC1740 2SC2021 2SC2636 2SC3311 2SC3399 2SC3401 2SC536	3C 3C 3C 3C 3C
2SD	2SD1450	3C

DIODE		
	NAME	L
H	HZS4.3EB2 HZS7.5EB2 HZT33-02 HZ30-2	2E 2E 2E 2E
L	LTZ-MR15	3E
M	MA165 MA27TB MA27W(A) MTZ11B MTZ5.1	1E 7E 2E 2E
R	RD10ES-T1B2 RD9.1ESB2	2E 2E
S	SLR-34MC3F SLR-34VC3F S4VB10-F2	4E 4E 5E
	1SS132 1SS292 1SS133 11E2	1E 1E 1E

Note: FOR INSTANCE, AN3380K →
2A: SEE COLUMN 2, LINE A

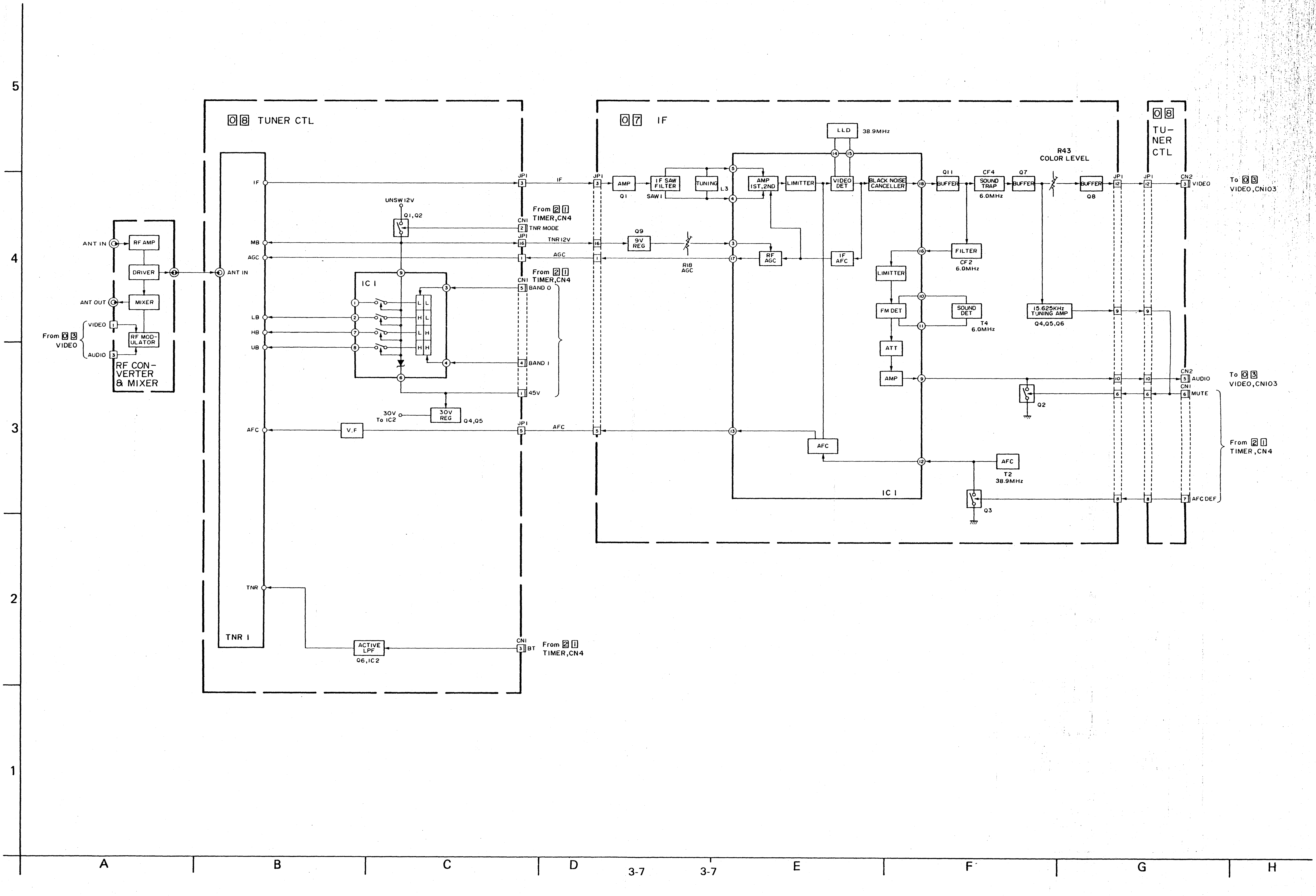
	Integrated Circuit		Transistor		Diode
	A	B	C	D	E
1					
2					
3					
4					
5					
6					
7					
8					
9					

3.5 BOARD INTERCONNECTION DIAGRAM

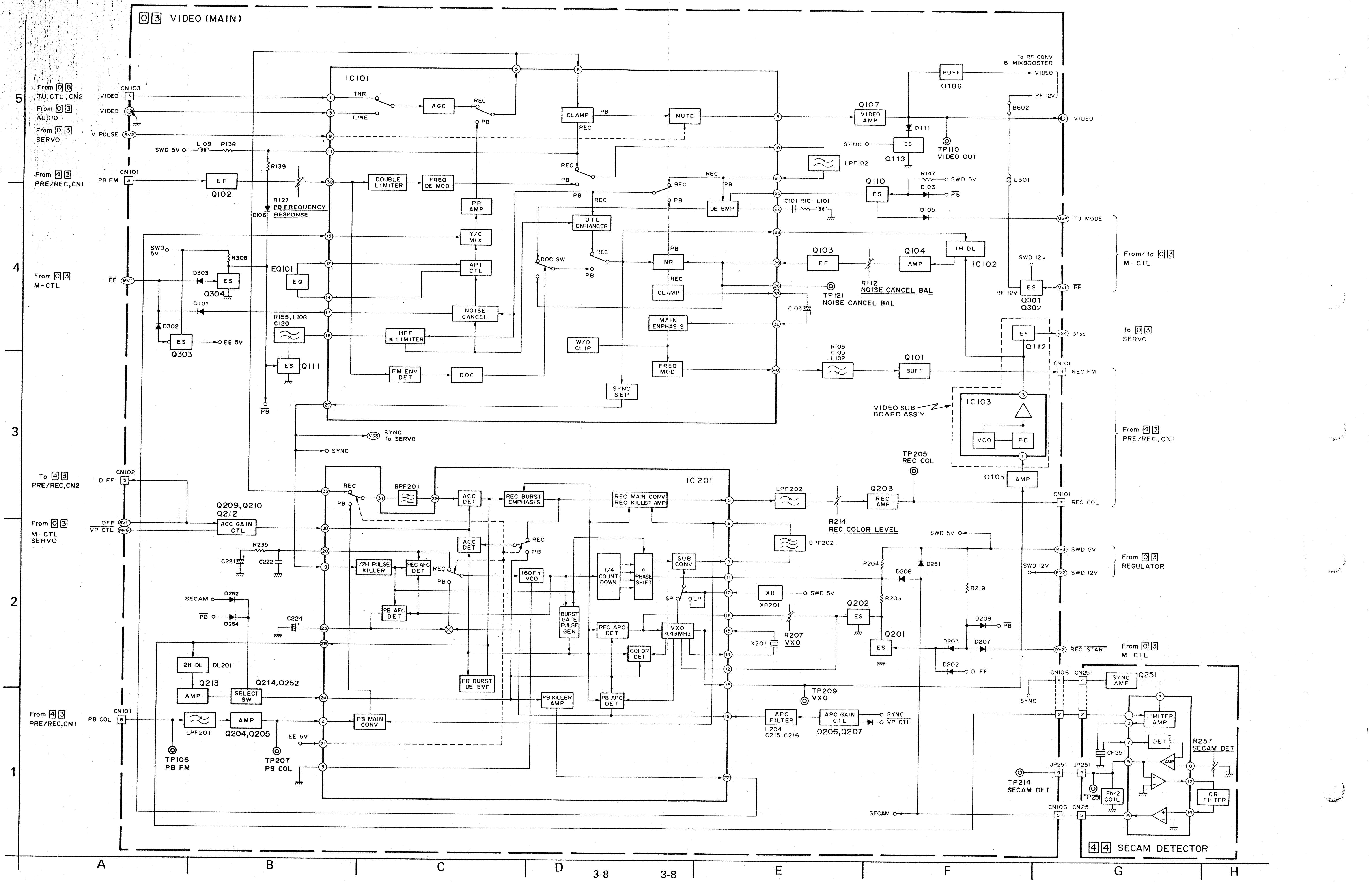

RF OUT
RF IN
RF CONVERTER / MIX BOOSTER
VIDEO
GND
AUDIO
RF 12V
UNSW 12V
S101 Voltage SELECTOR
4 (240) BLU
3 (220)
2 (127)
1 (110)
P
YLW
RED
ORG
GRY
BRN
BLU
AC 110/127/220/240V 50/60Hz
CN1
CN2
GND
-30V
AC 4.5V
AC 4.5V
CLK REF
45V
01 POWER TRANS
CN801
UNREG 18 V
GND(M)
GND
UNREG 18V
BIAS
UNREG 9V
CN202
CN605
UNSW 12V
REMOTE
POWER LED
TRACKING (+)
TRACKING (-)
OP 1
OP 2
GND
CN201
CN606
SWD 5V
PLAY LED
PAUSE LED
REC LED
22 OPERATION
PB
REC
R
CTL
12 A/C HEAD
CN1
MOTOR 12V
GND (M)
DRUM FG/PG
DRUM DRIVE
DRUM ON/OFF
58 DRUM MOTOR
CN402
MOTOR 12V
GND (M)
DRUM FG/PG
DRUM DRIVE
DRUM ON/OFF
CN1
REC
PB
GND
AE
GND
FE
CN401
CTL HEAD(+)
CTL HEAD(-)
GND
CN2
FE HEAD
GND
03 MAIN
AUDIO - CN1
VIDEO - CN101
SERVO - CN401
MECHACON - CN601
REGULATOR - CN801
08 TU CTL
07 IF
JP1
AGC
NC
IF
GND
AFC
MUTE
NC
AFC DEF
SYNC DET
AUDIO
GND
VIDEO
GND
NC
GND
TU 12V
CN103
GND
UNSW 12V
VIDEO
GND
AUDIO
GND
CH-2
CH-1
41 U. DRUM
42 CONNECT
43 PRE/REC
REC +
PB/REC -
PB/REC -
REC +
CN3
CN101
SYNC
GND
PB FM
REC FM
GND
GND
REC COLOR
PB COLOR
CN102
REC START
REC
NC
SWD 5V
DRUM FF
GND
CN4
45V
TU MODE
BT
BAND 1
BAND 0
MUTE
AFC DEF
CN603
COUNT PULSE
STROBE
DATA 0
DATA 1
DATA 2
DATA 3
CN604
UNSW 12V
TU MODE
INDEX ON/OFF
TRACKING (+)
TRACKING (-)
21 TIMER/DISPLAY
CN3
56 CASS HOUSING
CASS MOTOR
CASS MOTOR(-)
CASS MOTOR(+)
CASS SENS
MOTOR 12V
START SENS
CN602
GND
CASSETTE MOTOR(-)
CASSETTE MOTOR(+)
CASSETTE SENSOR
MOTOR 12V
START SENSOR
REEL MOTOR
CAPSTAN MOTOR
51 DECK TERMINAL
J1
J2
J3
J4
J5
J6
J7
ORG
YLW
53 REC SAFETY
MODE MOTOR
RED
BRN
52 RELAY
54 END SENSOR
CN601
REEL MOTOR(+)
REEL MOTOR(-)
CAP MOTOR(+)
MODE MOTOR(-)
CAP MOTOR(-)
MODE MOTOR(+)
SWD 5V
END SENSOR
TU FG
MODE SENSOR 1
CAP FG(+)
MODE SENSOR 2
CAP FG(-)
REC SAFETY
GND
CN5
CLK
I/O
CE
PCLR
UNSW 5V
GND
-30V
CN101
35 MEMORY
1
2
3
4
5
A
B
C
D
E
F
G
H

NO.	PWB NAME
58	DRUM MOTOR
57	
56	CASSETTE HOUSING
55	
54	END SENSOR
53	REC SAFETY
52	RELAY
51	DECK TERMINAL
44	
43	PRE / REC
42	CONNECT
41	U. DRUM
35	MEMORY
22	OPERATION
21	TIMER / DISPLAY
20	
19	
18	
12	A/C HEAD
11	
10	
09	
08	TU CTL
07	IF
06	
05	
04	
03	MAIN
02	
01	POWER TRANS

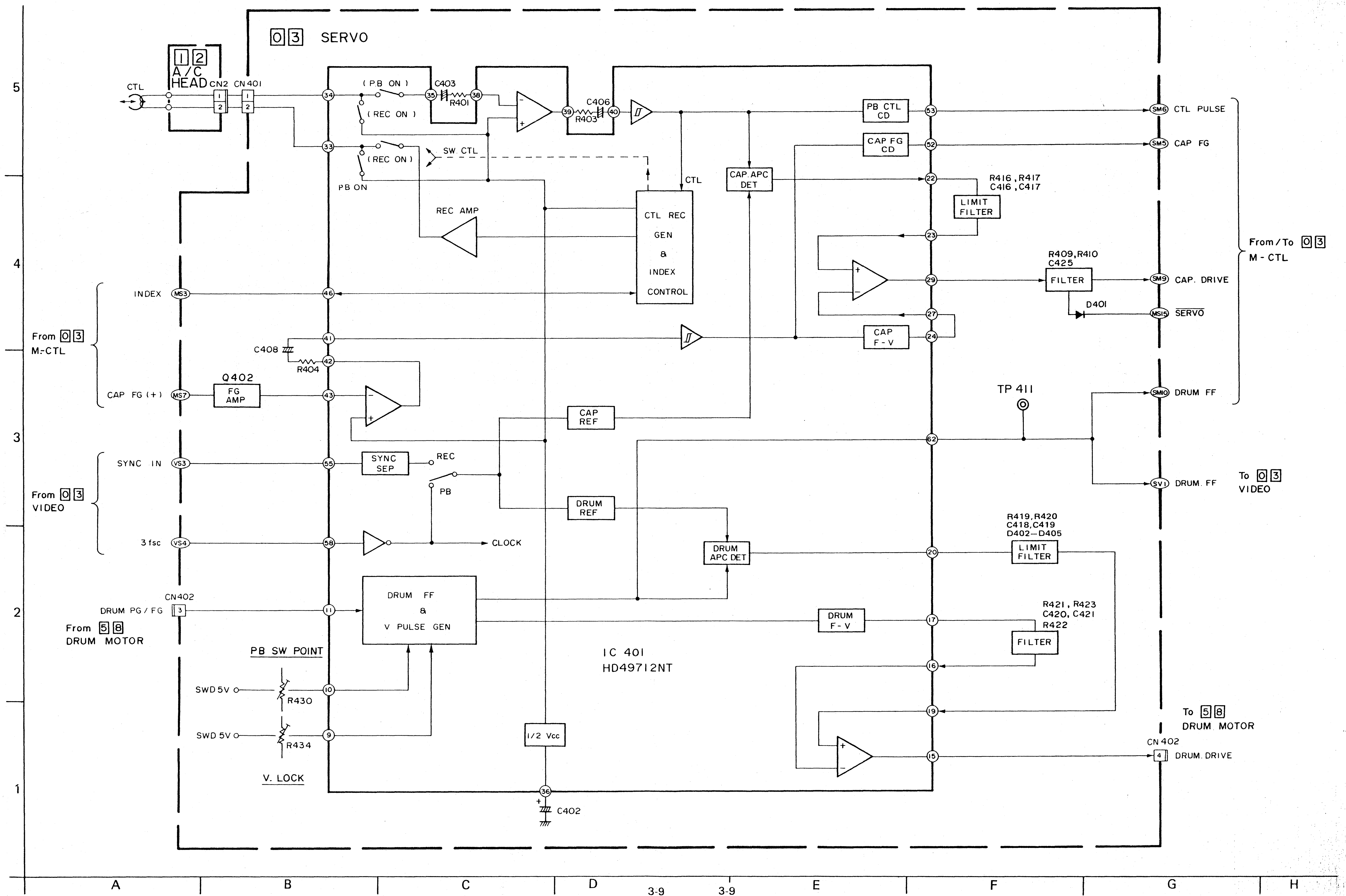
3.6 IF AND TUNER CTL BLOCK DIAGRAMS


08 TUNER CTL
07 IF
08 TU-NER CTL
RF AMP
DRIVER
MIXER
RF MOD-ULATOR
RF CON-VERTER & MIXER
ANT IN
ANT OUT
From 03 VIDEO
VIDEO
AUDIO
TNR 1
IF
MB
AGC
LB
HB
UB
AFC
TNR
UNSW 12V
Q1, Q2
IC 1
BAND 0
BAND 1
45V
30V To IC2
30V REG
Q4, Q5
V.F
ACTIVE LPF
Q6, IC2
JP1
CN1
TNR MODE
TNR 12V
BT
From 21 TIMER, CN4
AMP
Q1
IF SAW FILTER
SAW1
TUNING
L3
LLD
38.9MHz
AMP 1ST, 2ND
LIMITTER
VIDEO DET
BLACK NOISE CANCELLER
Q11
BUFFER
CF4
SOUND TRAP
6.0MHz
Q7
BUFFER
R43 COLOR LEVEL
BUFFER
Q8
Q9
9V REG
R18 AGC
RF AGC
IF AFC
FILTER
CF2 6.0MHz
LIMITTER
FM DET
SOUND DET
T4 6.0MHz
ATT
AMP
15.625KHz TUNING AMP
Q4, Q5, Q6
Q2
AFC
AFC
T2 38.9MHz
Q3
IC 1
CN2
VIDEO
AUDIO
MUTE
AFC DEF
To 03 VIDEO, CN103
To 03 VIDEO, CN103
From 21 TIMER, CN4
A
B
C
D
E
F
G
H
1
2
3
4
5

3.7 VIDEO BLOCK DIAGRAM

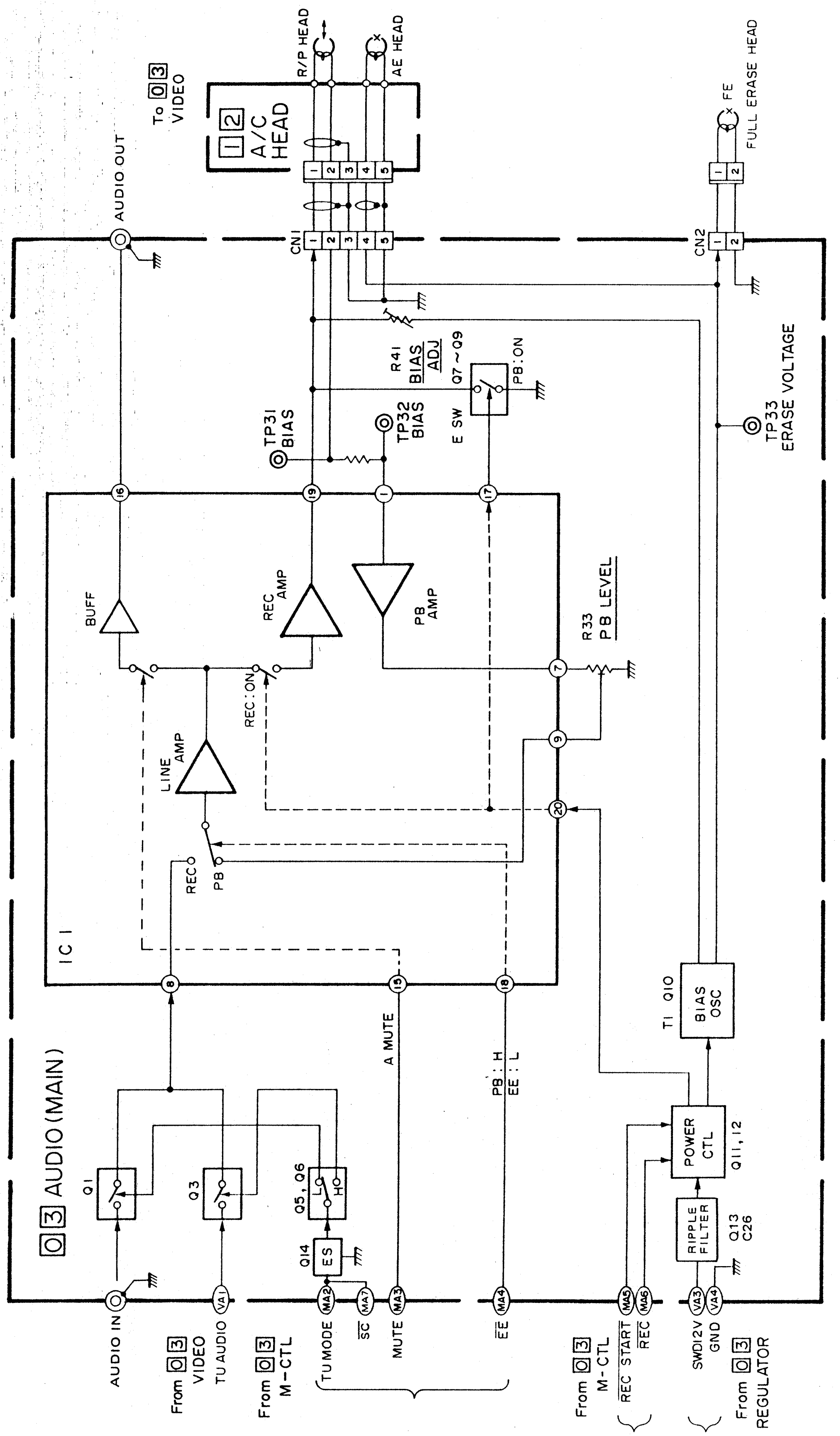

03 VIDEO (MAIN)
From 08 TU CTL, CN2
From 03 AUDIO
From 03 SERVO
From 43 PRE/REC, CN1
From 03 M-CTL
To 43 PRE/REC, CN2
From 03 M-CTL SERVO
From 43 PRE/REC, CN1
CN103
VIDEO
V PULSE
SWD 5V
L109
R138
CN101
PB FM
EF
Q102
R139
R127
PB FREQUENCY RESPONSE
D106
IC101
TNR
LINE
AGC
REC
PB
DOUBLE LIMITER
FREQ DE MOD
PB AMP
Y/C MIX
APT CTL
EQ101
EQ
NOISE CANCEL
HPF & LIMITER
FM ENV DET
DOC
R155, L108
C120
ES
Q111
SWD 5V
R308
D303
Q304
D101
D302
Q303
EE 5V
EE
CLAMP
MUTE
DTL ENHANCER
DOC SW
NR
MAIN ENHPASIS
W/D CLIP
FREQ MOD
SYNC SEP
DE EMP
C101 R101 L101
LPF102
Q107
VIDEO AMP
BUFF
Q106
To RF CONV & MIXBOOSTER
RF 12V
B602
D111
SYNC
Q113
TP110 VIDEO OUT
Q110
R147
D103
D105
L301
TU MODE
1H DL
IC102
Q103
Q104
AMP
R112
NOISE CANCEL BAL
TP121
C103
SWD 12V
Q301
Q302
From/To 03 M-CTL
EF
Q112
3fsc
To 03 SERVO
R105 C105 L102
Q101
CN101
REC FM
VIDEO SUB BOARD ASS'Y
IC103
VCO
PD
Q105
From 43 PRE/REC, CN1
SYNC To SERVO
SYNC
CN102
D. FF
DFF
VP CTL
Q209, Q210
Q212
ACC GAIN CTL
R235
C221
C222
IC201
BPF201
ACC DET
REC BURST EMPHASIS
REC MAIN CONV REC KILLER AMP
1/2H PULSE KILLER
REC AFC DET
PB AFC DET
160Fh VCO
BURST GATE PULSE GEN
1/4 COUNT DOWN
4 PHASE SHIFT
SUB CONV
SP
LP
XB
XB201
REC APC DET
VXO 4.43MHz
X201
COLOR DET
PB BURST DE EMP
PB KILLER AMP
PB APC DET
PB MAIN CONV
TP205 REC COL
LPF202
Q203
REC AMP
R214
REC COLOR LEVEL
REC COL
BPF202
SWD 5V
SWD 12V
From 03 REGULATOR
R204
D206
D251
R219
R203
Q202
R207
VXO
Q201
D208
D203
D207
D202
REC START
From 03 M-CTL
TP209 VXO
APC FILTER
L204 C215, C216
APC GAIN CTL
Q206, Q207
SECAM
D252
D254
C224
2H DL
DL201
Q213
Q214, Q252
SELECT SW
LPF201
Q204, Q205
TP106 PB FM
TP207 PB COL
EE 5V
PB COL
CN106
CN251
Q251
SYNC AMP
LIMITER AMP
DET
CF251
R257
SECAM DET
JP251
TP214 SECAM DET
TP251
Fh/2 COIL
CR FILTER
44 SECAM DETECTOR
A
B
C
D
E
F
G
H
1
2
3
4
5

3.8 SERVO BLOCK DIAGRAM



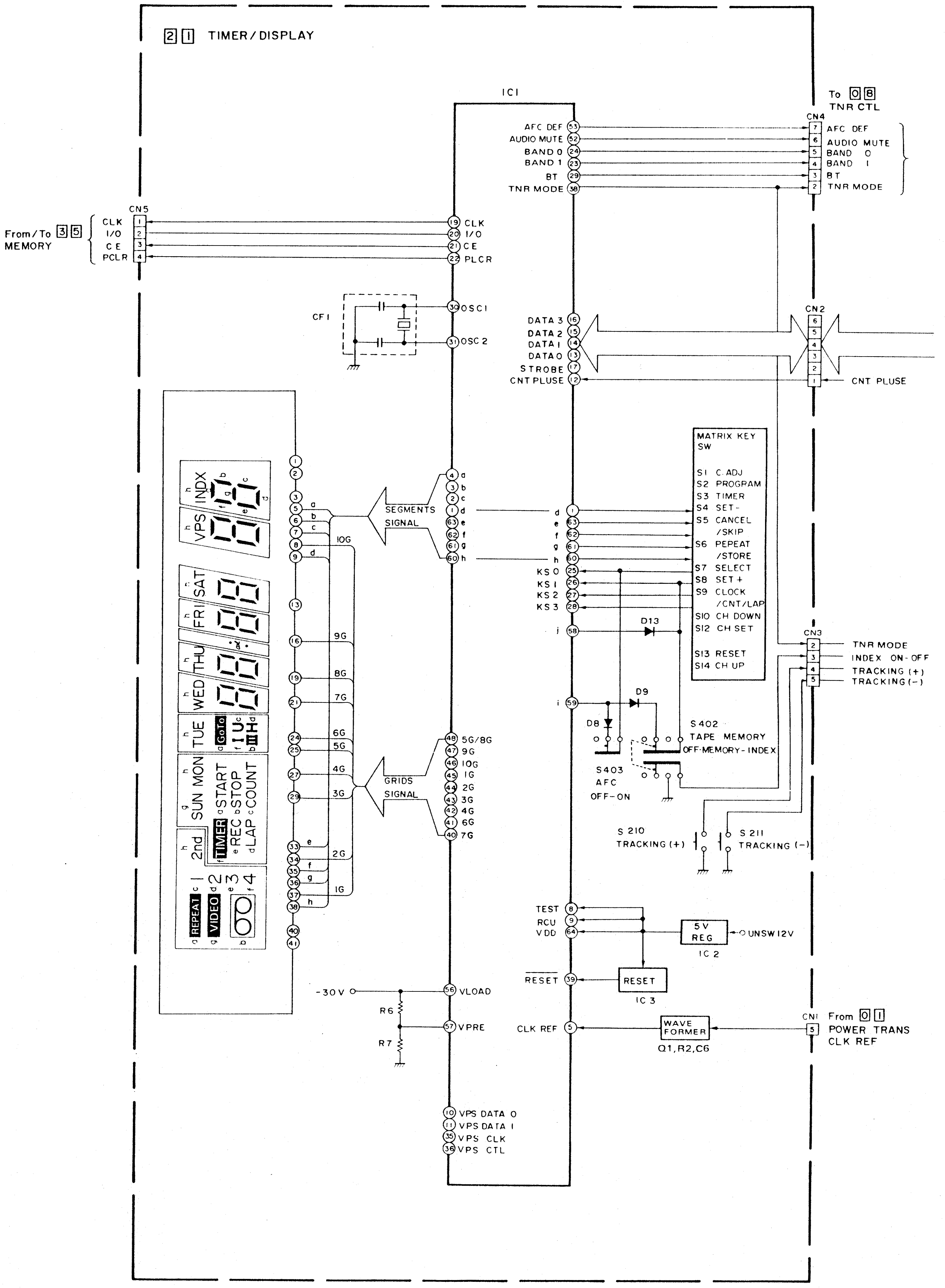
0 3 SERVO
1 2 A/C HEAD
CTL
CN2
CN401
(PB ON)
(REC ON)
(REC ON)
PB ON
SW CTL
C403
R401
C406
R403
REC AMP
CTL REC GEN & INDEX CONTROL
CTL
CAP.APC DET
PB CTL CD
CAP FG CD
R416, R417
C416, C417
LIMIT FILTER
R409, R410
C425
FILTER
D401
CAP F-V
INDEX
MS3
From 0 3 M-CTL
C408
R404
Q402
CAP FG (+)
MS7
FG AMP
CAP REF
SYNC IN
VS3
From 0 3 VIDEO
SYNC SEP
REC
PB
DRUM REF
3 fsc
VS4
CLOCK
DRUM APC DET
CN402
DRUM PG/FG
From 5 8 DRUM MOTOR
DRUM FF & V PULSE GEN
DRUM F-V
PB SW POINT
SWD 5V
R430
SWD 5V
R434
V. LOCK
1/2 Vcc
C402
IC 401
HD49712NT
TP 411
R419, R420
C418, C419
D402–D405
LIMIT FILTER
R421, R423
C420, C421
R422
FILTER
SM6 CTL PULSE
SM5 CAP FG
SM9 CAP. DRIVE
MS15 SERVO
SM10 DRUM FF
From/To 0 3 M-CTL
SV1 DRUM. FF
To 0 3 VIDEO
To 5 8 DRUM MOTOR
CN402
4 DRUM. DRIVE
34
33
35
38
39
40
53
52
22
23
29
27
24
46
41
42
43
62
55
58
20
11
17
16
19
15
10
9
36
5
4
3
2
1
A
B
C
D
E
F
G
H

3.9 AUDIO BLOCK DIAGRAM

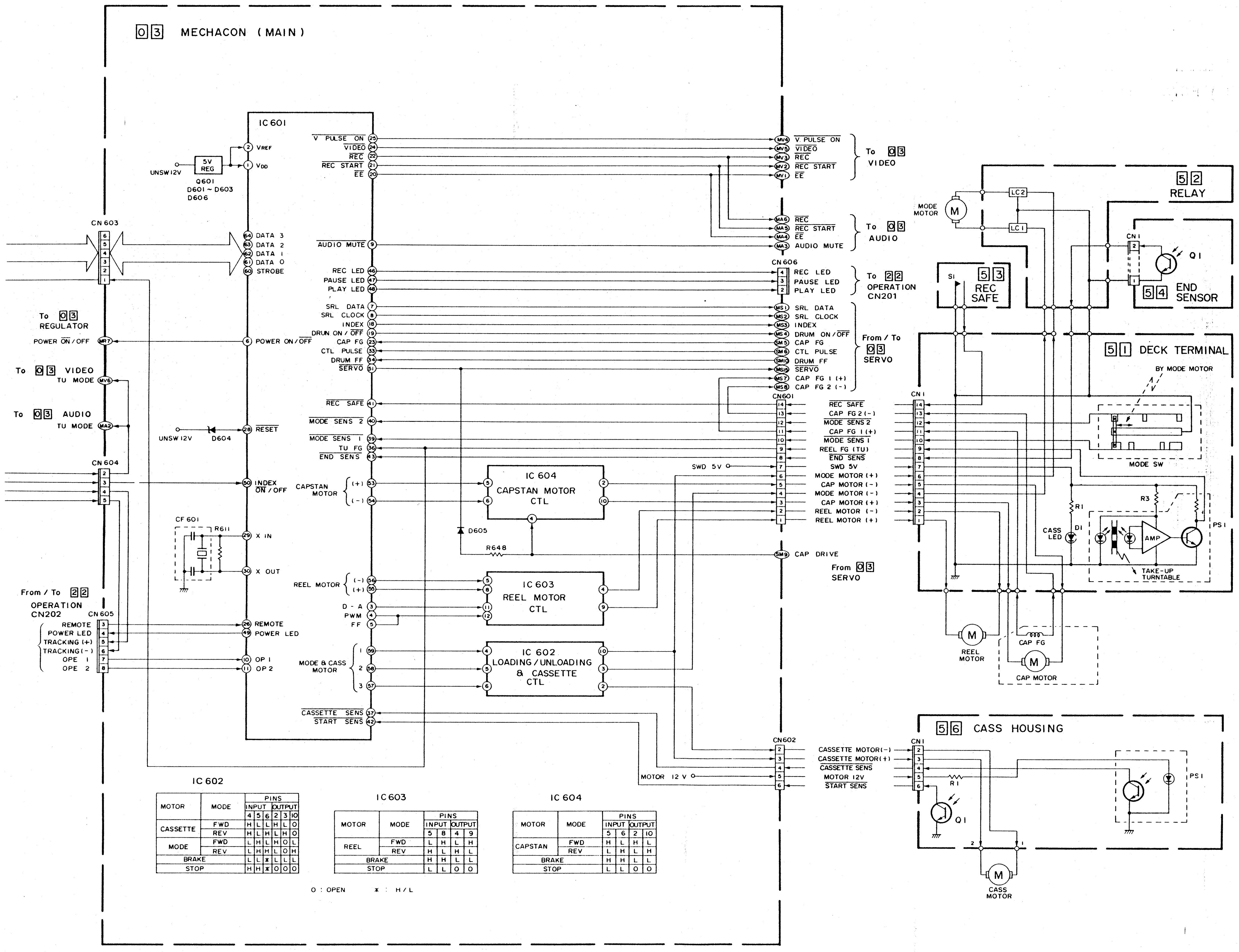


03 AUDIO (MAIN)
12 A/C HEAD
To 03 VIDEO
R/P HEAD
AE HEAD
FE
FULL ERASE HEAD
AUDIO OUT
CN1
CN2
R41 BIAS ADJ
Q7 ~ Q9
PB: ON
E SW
TP31 BIAS
TP32 BIAS
TP33 ERASE VOLTAGE
BUFF
REC AMP
PB AMP
R33 PB LEVEL
LINE AMP
REC: ON
REC
PB
IC 1
A MUTE
PB : H
EE : L
T1 Q10
BIAS OSC
POWER CTL
Q11, 12
RIPPLE FILTER
Q13 C26
Q1
Q3
Q5, Q6
L
H
Q14
ES
AUDIO IN
VA1
MA2
MA7
MA3
MA4
MA5
MA6
VA3
VA4
From 03 VIDEO
TU AUDIO
From 03 M-CTL
TU MODE
SC
MUTE
EE
From 03 M-CTL
REC START
REC
SWD12V
GND
From 03 REGULATOR

3.10 MECHANISM CONTROL AND TIMER/DISPLAY BLOCK DIAGRAMS



21 TIMER/DISPLAY
IC1
To 08 TNR CTL
CN4
AFC DEF
AUDIO MUTE
BAND 0
BAND 1
BT
TNR MODE
From/To 35 MEMORY
CN5
CLK
I/O
CE
PLCR
CF1
OSC1
OSC2
CN2
DATA 3
DATA 2
DATA 1
DATA 0
STROBE
CNT PLUSE
SEGMENTS SIGNAL
GRIDS SIGNAL
MATRIX KEY SW
S1 C.ADJ
S2 PROGRAM
S3 TIMER
S4 SET-
S5 CANCEL /SKIP
S6 PEPEAT /STORE
S7 SELECT
S8 SET+
S9 CLOCK /CNT/LAP
S10 CH DOWN
S12 CH SET
S13 RESET
S14 CH UP
KS0
KS1
KS2
KS3
D13
D9
D8
CN3
TNR MODE
INDEX ON-OFF
TRACKING (+)
TRACKING (-)
S402 TAPE MEMORY OFF-MEMORY-INDEX
S403 AFC OFF-ON
S210 TRACKING (+)
S211 TRACKING (-)
VPS
INDX
SAT
FRI
THU
WED
TUE
MON
SUN
GoTo
START
STOP
COUNT
REC
LAP
TIMER
2nd
REPEAT
VIDEO
5G/8G
9G
10G
1G
2G
3G
4G
6G
7G
8G
TEST
RCU
VDD
5V REG
IC 2
UNSW12V
RESET
IC 3
-30V
R6
R7
VLOAD
VPRE
CLK REF
WAVE FORMER
Q1, R2, C6
CN1
From 01 POWER TRANS CLK REF
VPS DATA 0
VPS DATA 1
VPS CLK
VPS CTL


03 MECHACON (MAIN)
IC601
5V REG
UNSW12V
Q601
D601 ~ D603
D606
VREF
VDD
V PULSE ON
VIDEO
REC
REC START
EE
CN603
DATA 3
DATA 2
DATA 1
DATA 0
STROBE
AUDIO MUTE
REC LED
PAUSE LED
PLAY LED
SRL DATA
SRL CLOCK
INDEX
DRUN ON / OFF
CAP FG
CTL PULSE
DRUM FF
SERVO
To 03 REGULATOR
POWER ON / OFF
MR7
POWER ON / OFF
To 03 VIDEO
TU MODE
MV6
To 03 AUDIO
TU MODE
MA2
REC SAFE
MODE SENS 2
MODE SENS 1
TU FG
END SENS
UNSW 12V
D604
RESET
CN604
INDEX ON / OFF
CAPSTAN MOTOR
(+)
(−)
IC604
CAPSTAN MOTOR CTL
D605
R648
CF601
R611
X IN
X OUT
REEL MOTOR
IC603
REEL MOTOR CTL
D - A
PWM
FF
From / To 22 OPERATION CN202
CN605
REMOTE
POWER LED
TRACKING (+)
TRACKING (−)
OPE 1
OPE 2
OP 1
OP 2
MODE & CASS MOTOR
IC602
LOADING / UNLOADING & CASSETTE CTL
CASSETTE SENS
START SENS
MV4 V. PULSE ON
MV5 VIDEO
MV3 REC
MV2 REC START
MV1 EE
To 03 VIDEO
MA6 REC
MA5 REC START
MA4 EE
MA3 AUDIO MUTE
To 03 AUDIO
CN606
REC LED
PAUSE LED
PLAY LED
To 22 OPERATION CN201
MS1 SRL DATA
MS2 SRL CLOCK
MS3 INDEX
MS4 DRUM ON / OFF
SM5 CAP FG
SM6 CTL PULSE
SM10 DRUM FF
MS15 SERVO
MS7 CAP FG 1 (+)
MS8 CAP FG 2 (−)
From / To 03 SERVO
CN601
REC SAFE
CAP FG 2 (−)
MODE SENS 2
CAP FG 1 (+)
MODE SENS 1
REEL FG (TU)
END SENS
SWD 5V
MODE MOTOR (+)
CAP MOTOR (−)
MODE MOTOR (−)
CAP MOTOR (+)
REEL MOTOR (−)
REEL MOTOR (+)
SM9 CAP DRIVE
From 03 SERVO
CN602
CASSETTE MOTOR (−)
CASSETTE MOTOR (+)
CASSETTE SENS
MOTOR 12V
START SENS
MOTOR 12 V
MODE MOTOR
LC2
LC1
52 RELAY
CN1
Q1
54 END SENSOR
S1
53 REC SAFE
51 DECK TERMINAL
BY MODE MOTOR
CN1
MODE SW
R1
R3
CASS LED
D1
AMP
PS1
TAKE-UP TURNTABLE
REEL MOTOR
CAP FG
CAP MOTOR
56 CASS HOUSING
CN1
R1
Q1
PS1
CASS MOTOR

IC 602

MOTOR	MODE	PINS					
		INPUT			OUTPUT		
		4	5	6	2	3	10
CASSETTE	FWD	H	L	L	H	L	O
	REV	H	L	H	L	H	O
MODE	FWD	L	H	L	H	O	L
	REV	L	H	H	L	O	H
BRAKE		L	L	*	L	L	L
STOP		H	H	*	O	O	O

IC603

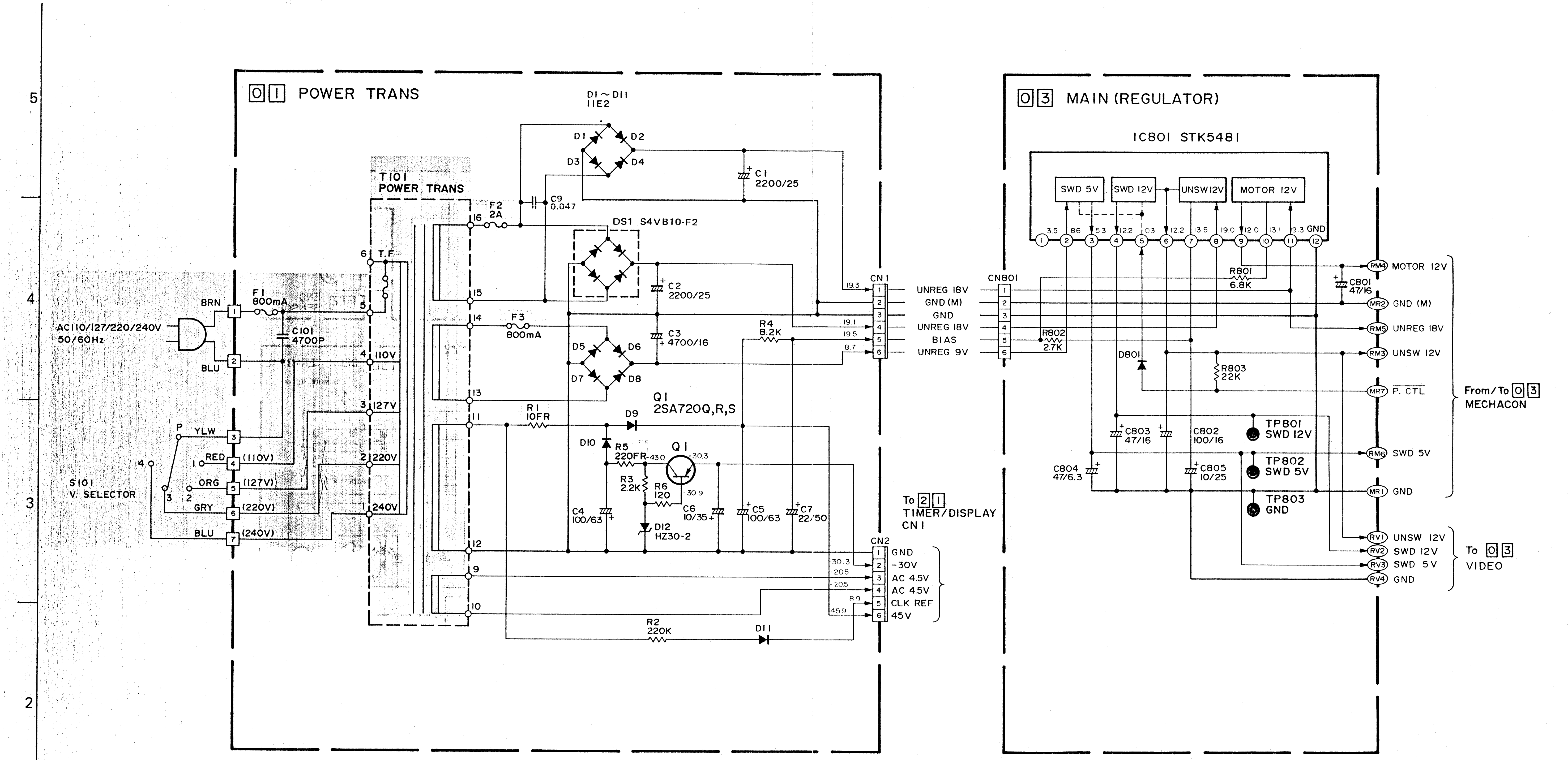
MOTOR	MODE	PINS			
		INPUT		OUTPUT	
		5	8	4	9
REEL	FWD	L	H	L	H
	REV	H	L	H	L
BRAKE		H	H	L	L
STOP		L	L	O	O

IC 604

MOTOR	MODE	PINS			
		INPUT		OUTPUT	
		5	6	2	10
CAPSTAN	FWD	H	L	H	L
	REV	L	H	L	H
BRAKE		H	H	L	L
STOP		L	L	O	O

O : OPEN   * : H / L

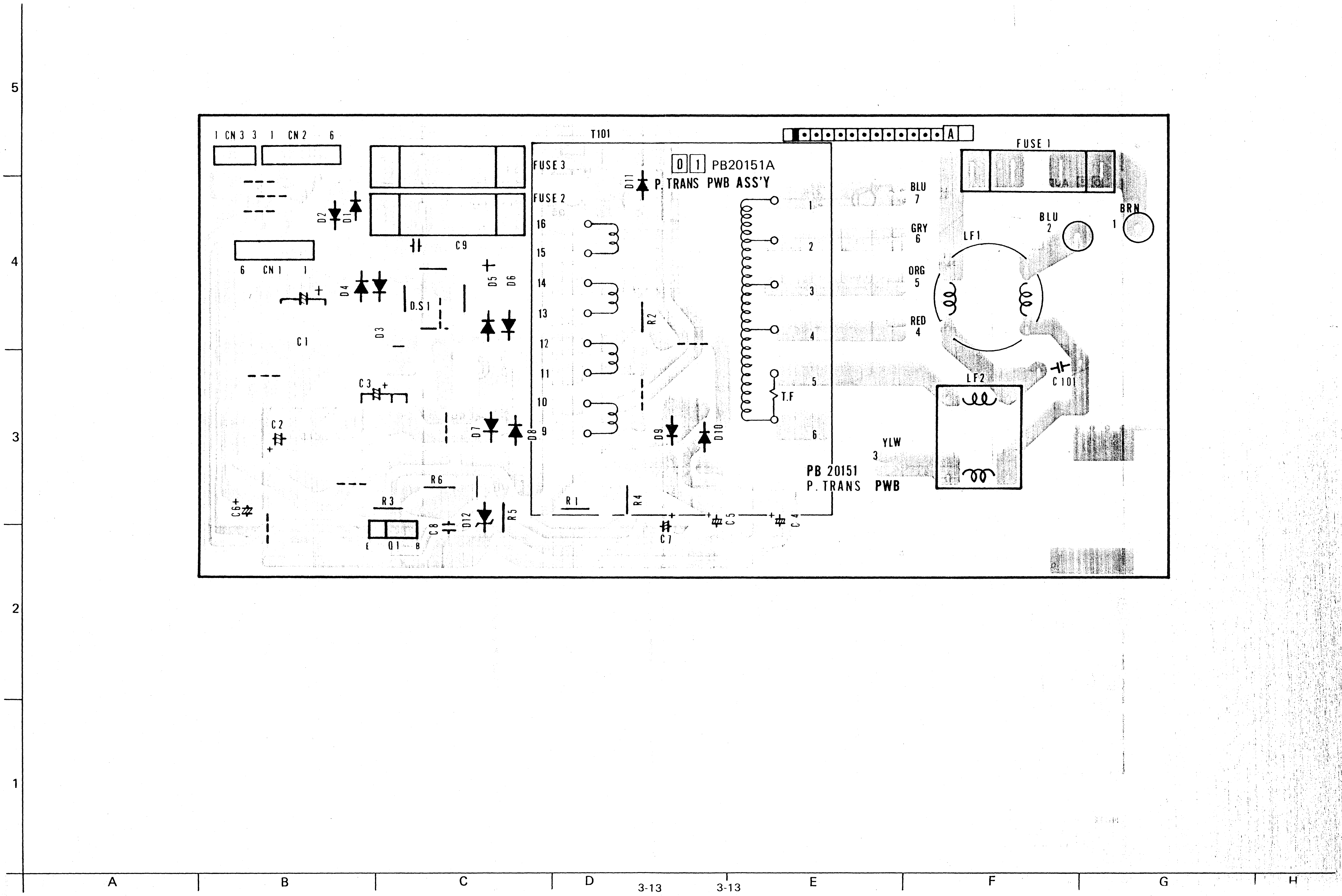
3.11 POWER TRANSFORMER AND REGULATOR SCHEMATIC DIAGRAMS


01 POWER TRANS
D1 ~ D11
11E2
D1
D2
D3
D4
C1
2200/25
T101
POWER TRANS
F2
2A
C9
0.047
DS1 S4VB10-F2
C2
2200/25
C3
4700/16
F3
800mA
R4
8.2K
D5
D6
D7
D8
Q1
2SA720Q,R,S
R1
10FR
D9
D10
R5
220FR
-43.0
-30.3
R3
2.2K
R6
120
-30.9
C4
100/63
C6
10/35
C5
100/63
C7
22/50
D12
HZ30-2
R2
220K
D11
T.F.
BRN
F1
800mA
C101
4700P
AC110/127/220/240V
50/60Hz
BLU
110V
127V
220V
240V
P
YLW
RED
(110V)
ORG
(127V)
GRY
(220V)
BLU
(240V)
S101
V. SELECTOR
CN1
UNREG 18V
GND (M)
GND
UNREG 18V
BIAS
UNREG 9V
19.3
19.1
19.5
8.7
To 21 TIMER/DISPLAY CN1
CN2
GND
-30V
AC 4.5V
AC 4.5V
CLK REF
45V
30.3
-20.5
-20.5
8.9
45.9
03 MAIN (REGULATOR)
IC801 STK5481
SWD 5V
SWD 12V
UNSW12V
MOTOR 12V
3.5
8.6
5.3
12.2
0.3
12.2
13.5
19.0
12.0
13.1
19.3
GND
CN801
R801
6.8K
C801
47/16
R802
2.7K
D801
R803
22K
C803
47/16
C802
100/16
C804
47/6.3
C805
10/25
TP801
SWD 12V
TP802
SWD 5V
TP803
GND
RM4 MOTOR 12V
MR2 GND (M)
RM5 UNREG 18V
RM3 UNSW 12V
MR7 P. CTL
RM6 SWD 5V
MR1 GND
From/To 03 MECHACON
RV1 UNSW 12V
RV2 SWD 12V
RV3 SWD 5V
RV4 GND
To 03 VIDEO
5
4
3
2
1
A
B
C
D
E
F
G
H

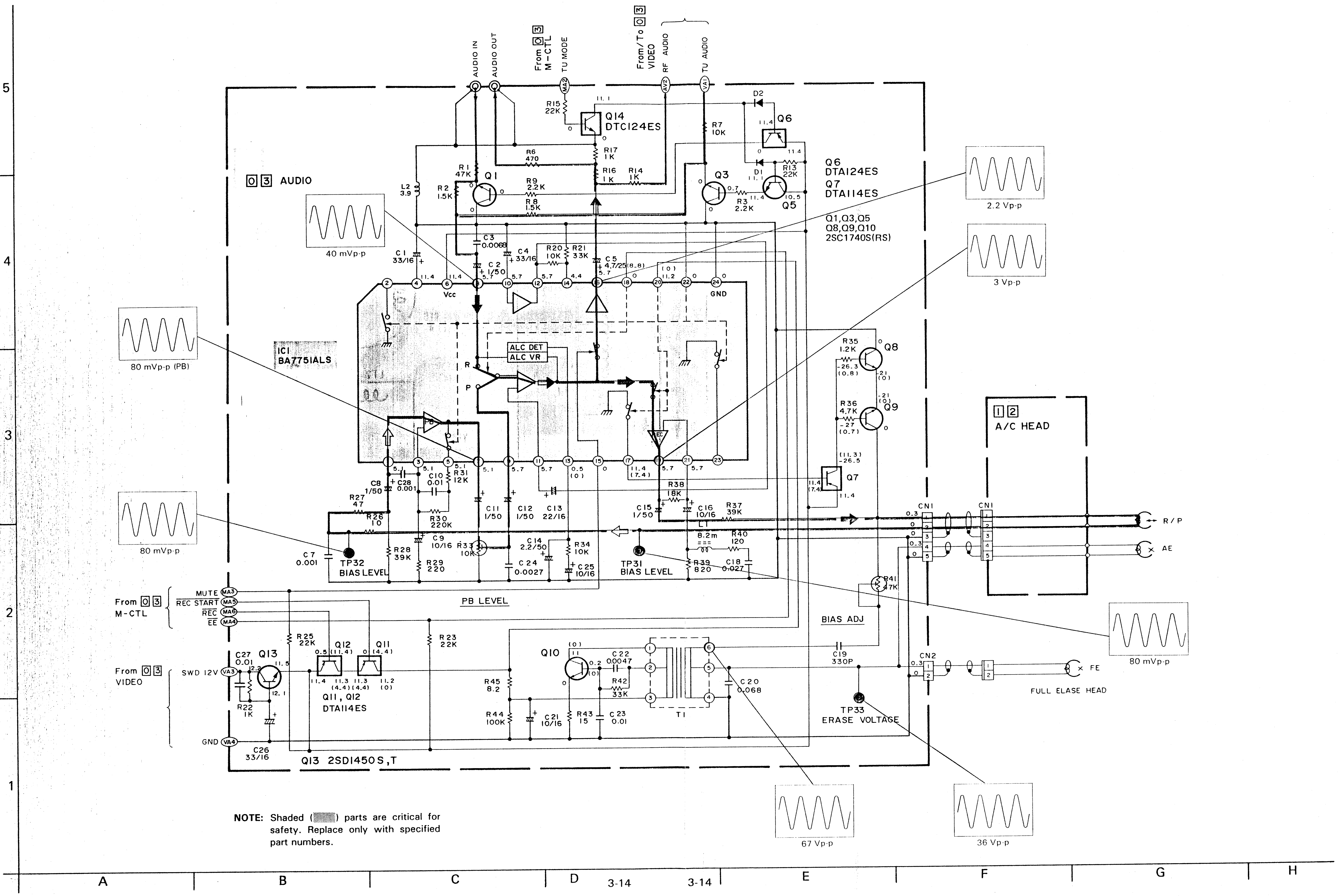
NOTES:

1. Shaded (▨) parts are critical for safety. Replace only with specified part numbers.
2. Voltages are DC-measured with a digital voltmeter during stop mode.

3.12 POWER TRANSFORMER CIRCUIT BOARD

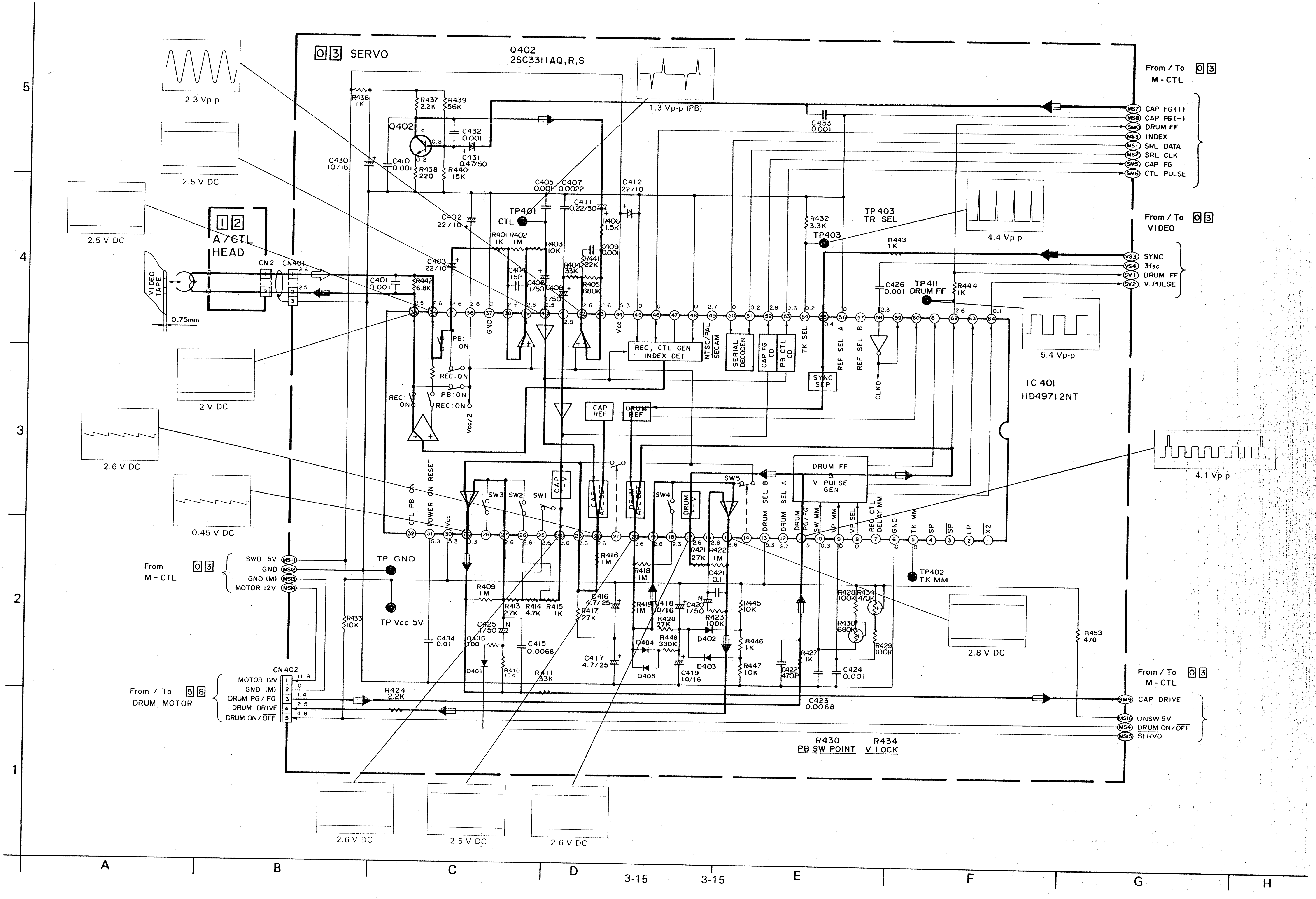

1 CN3 3
1 CN2 6
6 CN1 1
T101
FUSE 3
FUSE 2
FUSE 1
01 PB20151A
P. TRANS PWB ASS'Y
PB 20151
P. TRANS PWB
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D.S1
C1
C2
C3
C4
C5
C6
C7
C8
C9
C101
R1
R2
R3
R4
R5
R6
Q1
E
B
16
15
14
13
12
11
10
9
1
2
3
4
5
6
T.F
A
BLU 7
GRY 6
ORG 5
RED 4
YLW 3
BLU 2
BRN 1
LF1
LF2
5
4
3
2
1
A
B
C
D
E
F
G
H

3.13 AUDIO SCHEMATIC DIAGRAM

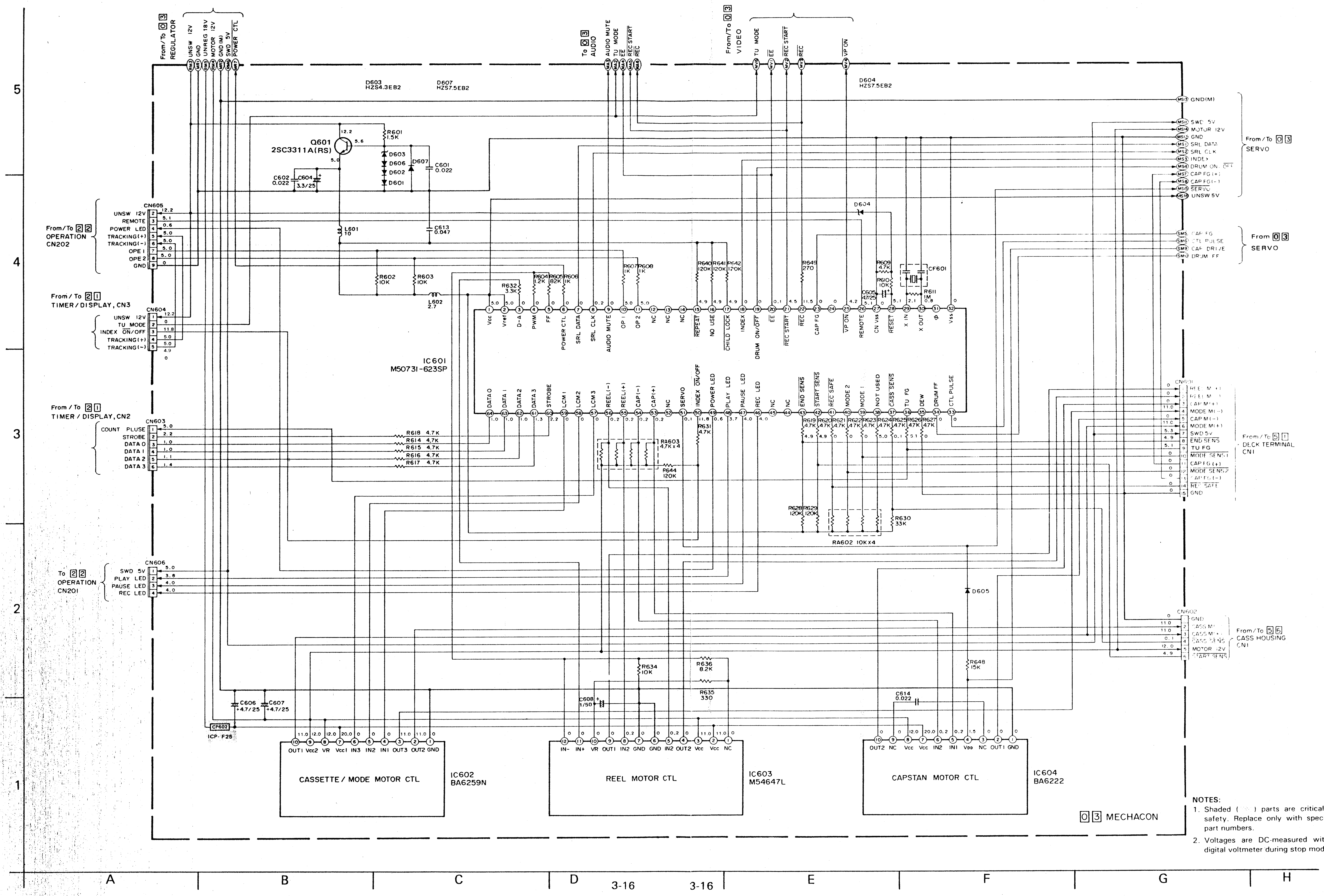

AUDIO IN
AUDIO OUT
From 03 M-CTL
TU MODE
From/To 03 VIDEO
RF AUDIO
TU AUDIO
03 AUDIO
Q14 DTC124ES
Q6 DTA124ES
Q7 DTA114ES
Q1,Q3,Q5 Q8,Q9,Q10 2SC1740S(RS)
IC1 BA7751ALS
ALC DET
ALC VR
Vcc
GND
REC
PB
R
P
12 A/C HEAD
R/P
AE
CN1
CN2
FE
FULL ELASE HEAD
TP32 BIAS LEVEL
TP31 BIAS LEVEL
TP33 ERASE VOLTAGE
PB LEVEL
BIAS ADJ
From 03 M-CTL
MUTE
REC START
REC
EE
From 03 VIDEO
SWD 12V
GND
Q11, Q12 DTA114ES
Q13 2SD1450S,T
T1
40 mVp-p
80 mVp-p (PB)
80 mVp-p
2.2 Vp-p
3 Vp-p
80 mVp-p
67 Vp-p
36 Vp-p
A
B
C
D
E
F
G
H
1
2
3
4
5

NOTE: Shaded (▨) parts are critical for safety. Replace only with specified part numbers.

3.14 SERVO SCHEMATIC DIAGRAM

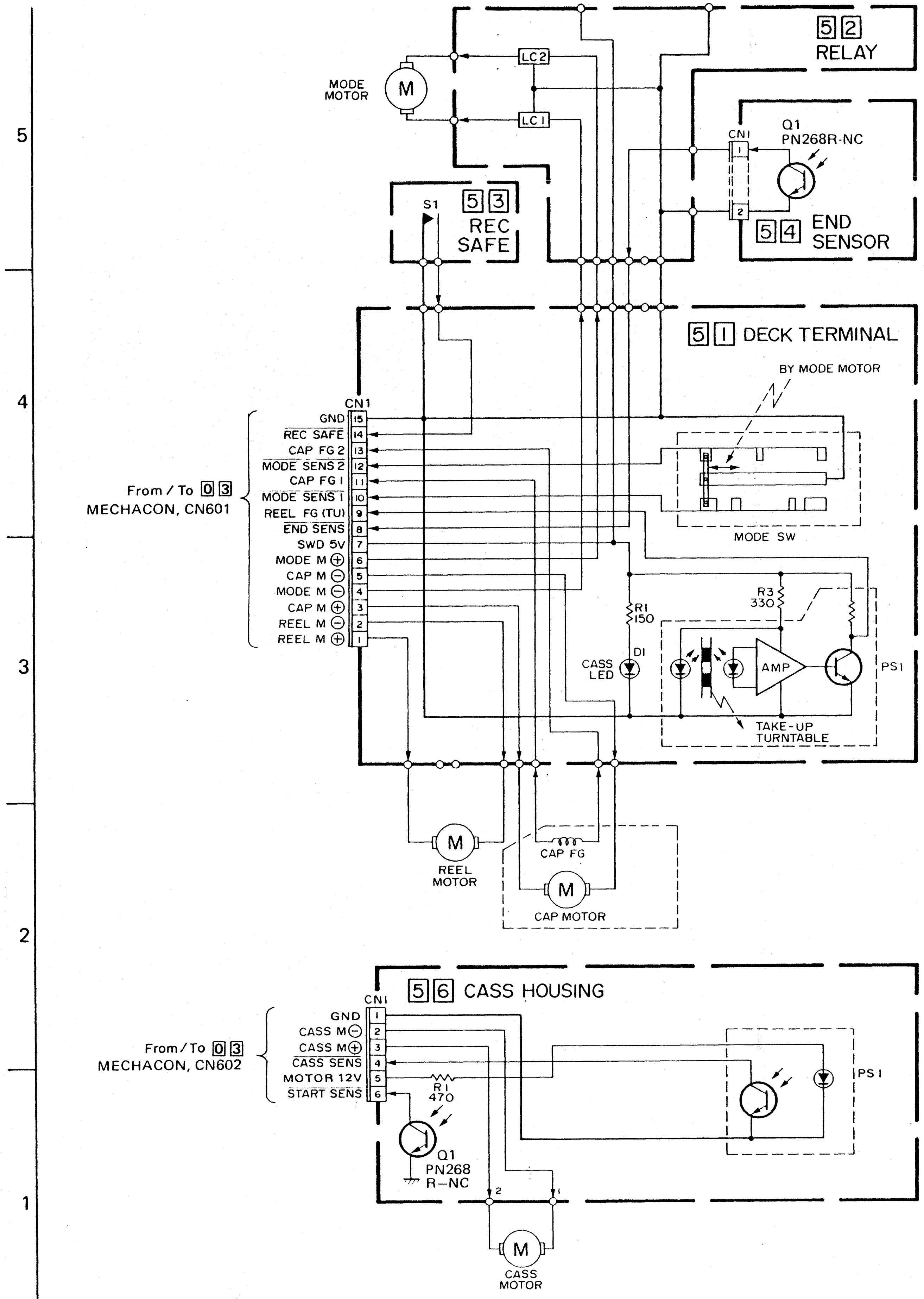

03 SERVO
Q402
2SC3311AQ,R,S
2.3 Vp-p
1.3 Vp-p (PB)
2.5 V DC
2.5 V DC
12 A/CTL HEAD
VIDEO TAPE
0.75mm
CN2
CN401
2 V DC
2.6 V DC
0.45 V DC
R436 1K
R437 2.2K
R439 56K
C432 0.001
C431 0.47/50
C430 10/16
C410 0.001
R438 220
R440 15K
C405 0.001
C407 0.0022
C412 22/10
C411 0.22/50
C402 22/10
TP401 CTL
R401 1K
R402 1M
R403 10K
R406 1.5K
C409 0.001
R441 22K
R404 33K
R405 680K
C403 22/10
C401 0.001
R442 6.8K
C404 15P
C406 1/50
C408 1/50
PB: ON
REC: ON
PB: ON
REC: ON
Vcc/2
GND
Vcc
REC, CTL GEN INDEX DET
NTSC/PAL SECAM
SERIAL DECODER
CAP FG CD
PB CTL CD
TK SEL
REF SEL A
REF SEL B
SYNC SEP
CLKO
C433 0.001
R432 3.3K
TP403 TR SEL
TP403
R443 1K
4.4 Vp-p
C426 0.001
TP411 DRUM FF
R444 1K
5.4 Vp-p
IC 401
HD49712NT
From / To 03 M-CTL
CAP FG(+)
CAP FG(−)
DRUM FF
INDEX
SRL DATA
SRL CLK
CAP FG
CTL PULSE
From / To 03 VIDEO
SYNC
3fsc
DRUM FF
V. PULSE
4.1 Vp-p
CAP REF
DRUM REF
CTL PB ON
POWER ON RESET
Vcc
SW3
SW2
SW1
CAP F-V
CAP APC DET
DRUM APC DET
SW4
DRUM F-V
SW5
DRUM FF & V PULSE GEN
DRUM SEL B
DRUM SEL A
DRUM PG/FG
SW MM
VP MM
VP SEL
REC CTL DELAY MM
GND
TK MM
SP
SP
LP
X2
TP GND
TP Vcc 5V
TP402 TK MM
From 03 M-CTL
SWD 5V
GND
GND (M)
MOTOR 12V
R409 1M
R413 2.7K
R414 4.7K
R415 1K
R416 1M
R417 27K
C416 4.7/25
R418 1M
R419 1M
C418 10/16
C420 1/50
R420 27K
R421 27K
R422 1M
C421 0.1
R423 100K
R445 10K
R446 1K
R447 10K
R448 330K
D402
D403
D404
D405
C419 10/16
C417 4.7/25
R433 10K
C434 0.01
C425 1/50
R435 100
C415 0.0068
D401
R410 15K
R411 33K
R427 1K
C422 470P
C424 0.001
R428 100K
R434 470K
R430 680K
R429 100K
R453 470
2.8 V DC
CN402
From / To 58 DRUM MOTOR
MOTOR 12V
GND (M)
DRUM PG/FG
DRUM DRIVE
DRUM ON/OFF
R424 2.2K
C423 0.0068
From / To 03 M-CTL
CAP DRIVE
UNSW 5V
DRUM ON/OFF
SERVO
R430 PB SW POINT
R434 V.LOCK
2.6 V DC
2.5 V DC
2.6 V DC
5
4
3
2
1
A
B
C
D
E
F
G
H

3.15 MECHANISM CONTROL SCHEMATIC DIAGRAM


From/To 03 REGULATOR
UNSW 12V
GND
UNREG 18V
MOTOR 12V
GND(M)
SWD 5V
POWER CTL
To 03 AUDIO
AUDIO MUTE
TU MODE
EE
REC START
REC
From/To 03 VIDEO
TU MODE
EE
REC START
REC
VP ON
D603 HZS4.3EB2
D607 HZS7.5EB2
D604 HZS7.5EB2
Q601 2SC3311A(RS)
R601 1.5K
D603
D606
D602
D601
D607
C601 0.022
C602 0.022
C604 3.3/25
L601 10
C613 0.047
R602 10K
R603 10K
L602 2.7
From/To 22 OPERATION CN202
CN605
UNSW 12V
REMOTE
POWER LED
TRACKING(+)
TRACKING(−)
OPE 1
OPE 2
GND
From/To 21 TIMER/DISPLAY, CN3
CN604
UNSW 12V
TU_MODE
INDEX ON/OFF
TRACKING(+)
TRACKING(−)
From/To 21 TIMER/DISPLAY, CN2
CN603
COUNT PLUSE
STROBE
DATA 0
DATA 1
DATA 2
DATA 3
R618 4.7K
R614 4.7K
R615 4.7K
R616 4.7K
R617 4.7K
To 22 OPERATION CN201
CN606
SWD 5V
PLAY LED
PAUSE LED
REC LED
IC601 M50731-623SP
Vcc
Vref
D-A
PWM
FF
POWER CTL
SRL DATA
SRL CLK
AUDIO MUTE
OP 1
OP 2
NC
REPEAT
NO USE
CHILD LOCK
INDEX
DRUM ON/OFF
EE
REC START
REC
CAP FG
VP ON
REMOTE
CN Vss
RESET
X IN
X OUT
φ
Vss
DATA0
DATA1
DATA2
DATA3
STROBE
LCM1
LCM2
LCM3
REEL(−)
REEL(+)
CAP(−)
CAP(+)
SERVO
INDEX ON/OFF
POWER LED
PLAY LED
PAUSE LED
REC LED
END SENS
START SENS
REC SAFE
MODE 2
MODE 1
NOT USED
CASS SENS
TU FG
DEW
DRUM FF
CTL PULSE
R632 3.3K
R604 1.2K
R605 82K
R606 1K
R607 1K
R608 1K
R640 120K
R641 120K
R642 120K
R649 270
R609 4.7K
R610 10K
C605 47/25
CF601
R611 1M
RA603 4.7K×4
R644 120K
R631 4.7K
R619 4.7K
R620 4.7K
R621 4.7K
R622 4.7K
R623 4.7K
R624 4.7K
R625 4.7K
R626 4.7K
R627 4.7K
R628 120K
R629 120K
R630 33K
RA602 10K×4
D605
R634 10K
R636 8.2K
R635 330
R648 15K
C608 1/50
C614 0.022
C606 4.7/25
C607 4.7/25
CP602
ICP-F25
OUT1 Vcc2 VR Vcc1 IN3 IN2 IN1 OUT3 OUT2 GND
CASSETTE/MODE MOTOR CTL
IC602 BA6259N
IN− IN+ VR OUT1 IN2 GND GND IN2 OUT2 Vcc Vcc NC
REEL MOTOR CTL
IC603 M54647L
OUT2 NC Vcc Vcc IN2 IN1 VDD NC OUT1 GND
CAPSTAN MOTOR CTL
IC604 BA6222
GND(M)
SWD 5V
MOTOR 12V
GND
SRL DATA
SRL CLK
INDEX
DRUM ON/OFF
CAP FG(+)
CAP FG(−)
SERVO
UNSW 5V
From/To 03 SERVO
CAP FG
CTL PULSE
CAP DRIVE
DRUM FF
From 03 SERVO
CN601
REEL M(+)
REEL M(−)
CAP M(+)
MODE M(−)
CAP M(−)
MODE M(+)
SWD 5V
END SENS
TU FG
MODE SENS1
CAP FG(+)
MODE SENS2
CAP FG(−)
REC SAFE
GND
From/To 51 DECK TERMINAL CN1
CN602
GND
CASS M(−)
CASS M(+)
CASS SENS
MOTOR 12V
START SENS
From/To 56 CASS HOUSING CN1
03 MECHACON
A
B
C
D
E
F
G
H
1
2
3
4
5

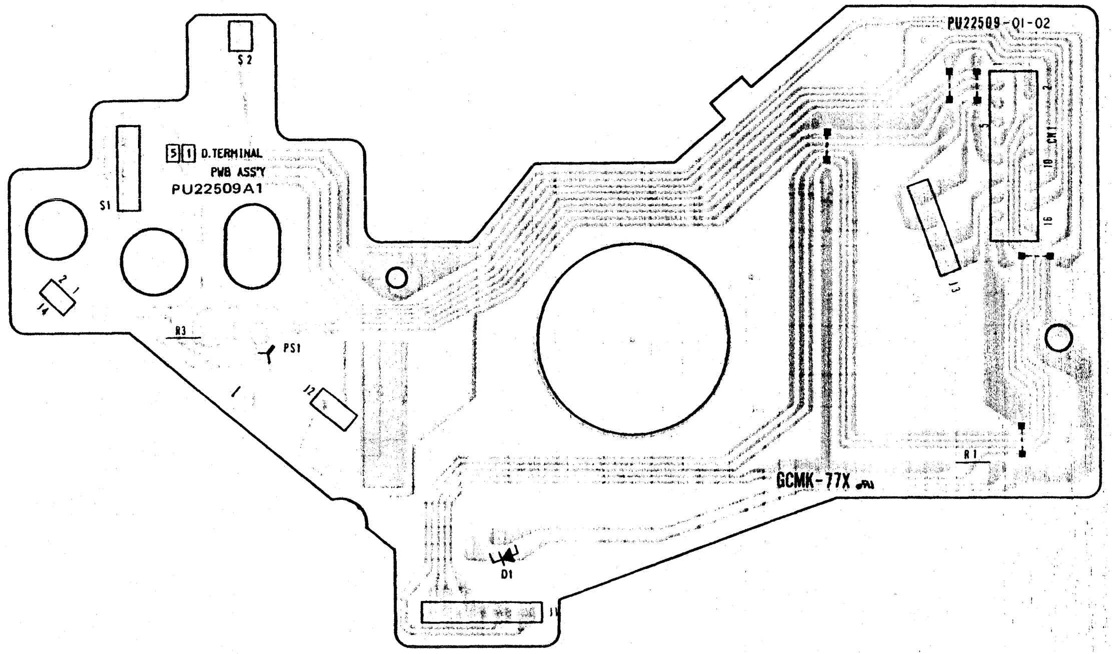
NOTES:
1. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.
2. Voltages are DC-measured with a digital voltmeter during stop mode.

3.16 DECK TERMINAL SCHEMATIC DIAGRAMS

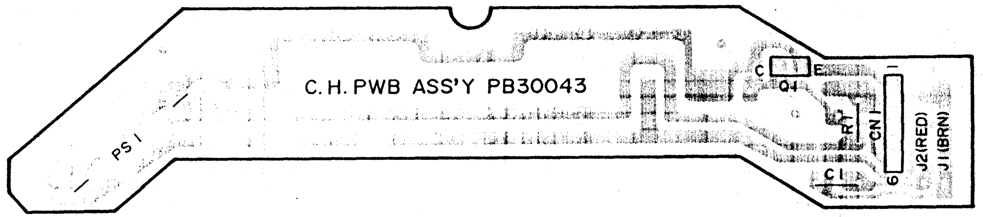

5
4
3
2
1
52 RELAY
MODE MOTOR
M
LC2
LC1
CN1
1
2
Q1
PN268R-NC
54 END SENSOR
S1
53 REC SAFE
51 DECK TERMINAL
BY MODE MOTOR
CN1
GND 15
REC SAFE 14
CAP FG 2 13
MODE SENS 2 12
CAP FG 1 11
MODE SENS 1 10
REEL FG (TU) 9
END SENS 8
SWD 5V 7
MODE M ⊕ 6
CAP M ⊖ 5
MODE M ⊖ 4
CAP M ⊕ 3
REEL M ⊖ 2
REEL M ⊕ 1
From / To 03
MECHACON, CN601
MODE SW
R3
330
R1
150
CASS LED
D1
AMP
PS1
TAKE-UP TURNTABLE
M
REEL MOTOR
CAP FG
M
CAP MOTOR
56 CASS HOUSING
CN1
GND 1
CASS M⊖ 2
CASS M⊕ 3
CASS SENS 4
MOTOR 12V 5
START SENS 6
From/To 03
MECHACON, CN602
R1
470
PS1
Q1
PN268
R-NC
2
1
M
CASS MOTOR

3.17 DECK TERMINAL CIRCUIT BOARDS

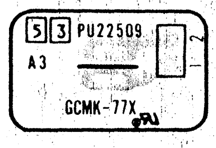
—DECK TERMINAL—


PU22509-Q1-02
S2
51 D.TERMINAL PWB ASS'Y
PU22509A1
S1
R3
PS1
J1
R1
D1
GCMK-77X

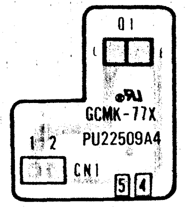
—CASSETTE HOUSING—


C.H. PWB ASS'Y PB30043
PS1
C
E
Q4
R1
CN1
C1
6
1
J2(RED)
J1(BRN)

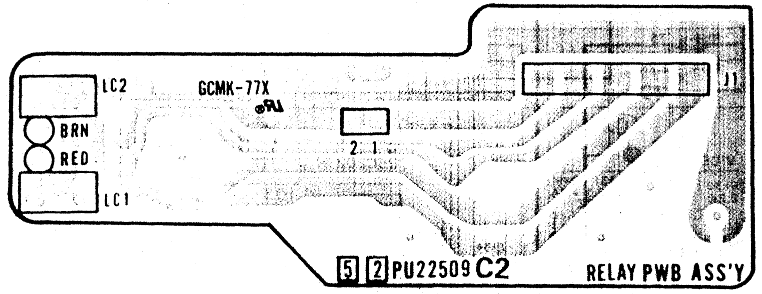
—REC SAFETY—


53 PU22509
A3
2
GCMK-77X

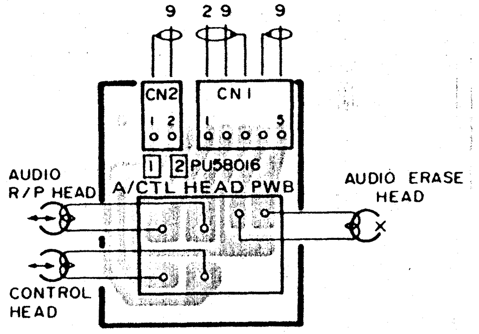
—END SENSOR—


Q1
GCMK-77X
PU22509A4
1 2
CN1
54

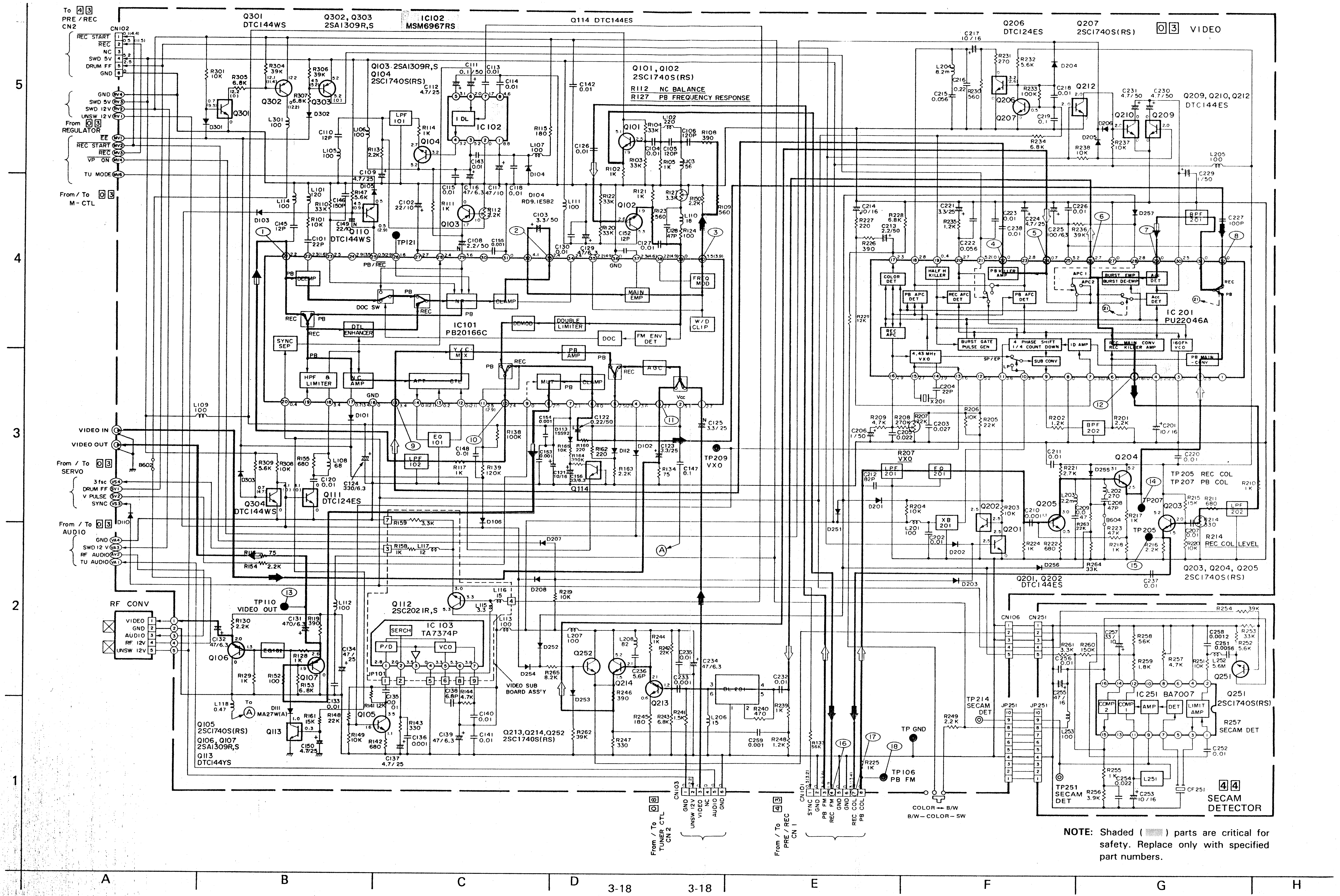
—RELAY—


LC2
GCMK-77X
BRN
RED
LC1
2 1
J1
52 PU22509 C2
RELAY PWB ASS'Y

—AUDIO/CTL HEAD—


9
2 9
9
CN2
1 2
CN1
1
5
12 PU58016
A/CTL HEAD PWB
AUDIO R/P HEAD
AUDIO ERASE HEAD
CONTROL HEAD

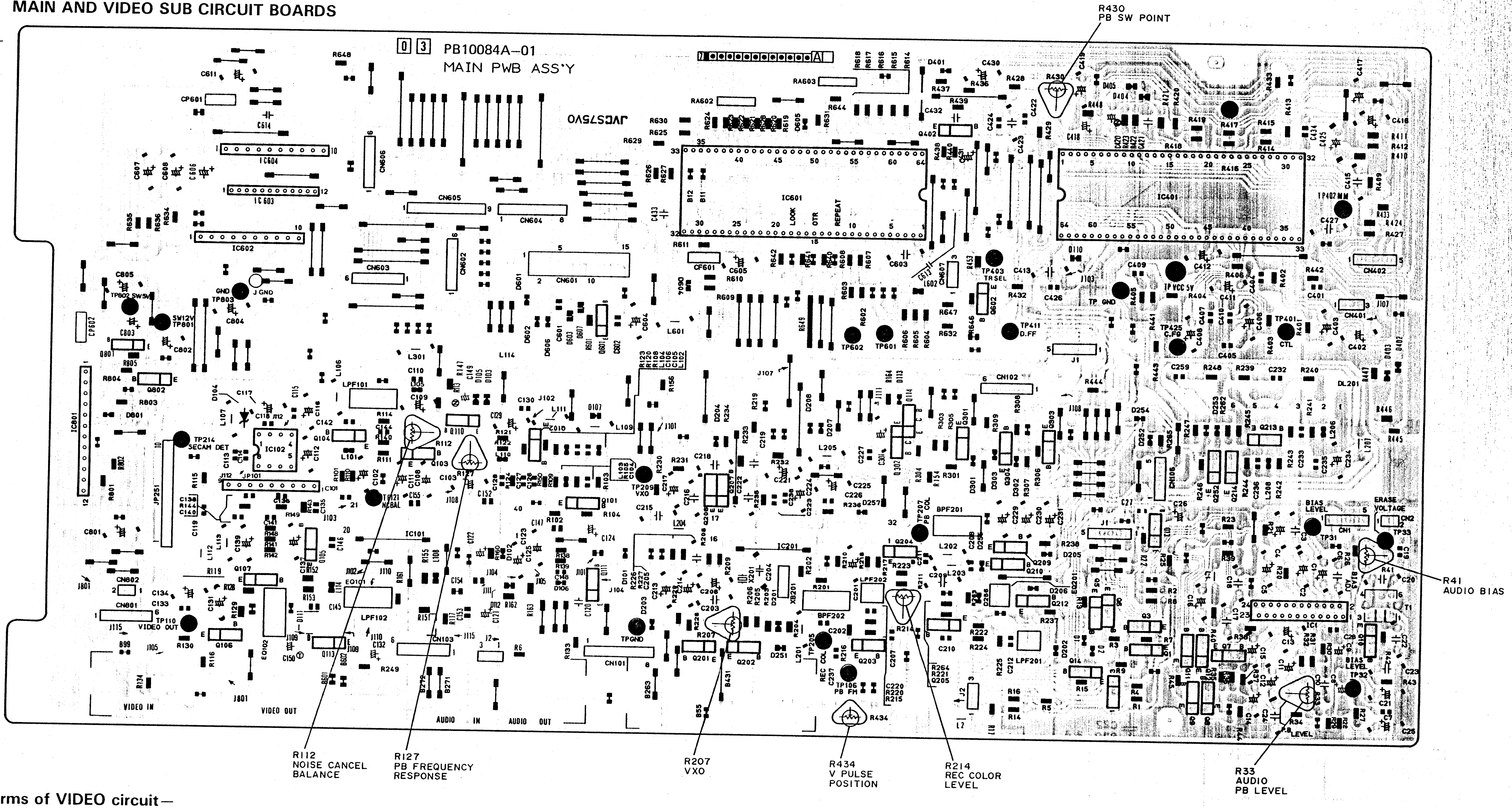
3.18 VIDEO SCHEMATIC DIAGRAM


To 4 3 PRE / REC CN2
CN102
REC START
REC
NC
SWD 5V
DRUM FF
GND
GND
SWD 5V
SWD 12V
UNSW 12V
From 0 3 REGULATOR
EE
REC START
REC
VP ON
TU MODE
From / To 0 3 M-CTL
VIDEO IN
VIDEO OUT
From / To 0 3 SERVO
3fsc
DRUM FF
V PULSE
SYNC
From / To 0 3 AUDIO
GND
SWD 12 V
RF AUDIO
TU AUDIO
RF CONV
VIDEO
GND
AUDIO
RF 12V
UNSW 12V
Q301 DTC144WS
Q302, Q303 2SA1309R,S
IC102 MSM6967RS
Q114 DTC144ES
Q103 2SA1309R,S
Q104 2SC1740S(RS)
Q101, Q102 2SC1740S(RS)
R112 NC BALANCE
R127 PB FREQUENCY RESPONSE
Q206 DTC124ES
Q207 2SC1740S(RS)
0 3 VIDEO
Q209, Q210, Q212 DTC144ES
1 DL
IC102
LPF 101
D104 RD9.1ESB2
Q110 DTC144WS
TP121
PB / REC
DEEMP
DOC SW
NL
CLAMP
MAIN EMP
FREQ MOD
W/D CLIP
DTL ENHANCER
SYNC SEP
DEMOD
DOUBLE LIMITER
DOC
FM ENV DET
IC101 PB20166C
Y/C MIX
PB AMP
AGC
HPF & LIMITER
NC AMP
APT
CTL
MUT
Vcc
EQ 101
LPF 102
C125 3.3/25
TP209 VXO
Q114
Q304 DTC144WS
Q111 DTC124ES
COLOR DET
HALF H KILLER
PB APC DET
REC AFC DET
PB KILLER AMP
PB AFC DET
APC1
APC2
BURST EMP
BURST DE-EMP
ACC DET
Acc DET
IC 201 PU22046A
REC APC
BURST GATE PULSE GEN
4 PHASE SHIFT 1/4 COUNT DOWN
ID AMP
REC MAIN CONV REC KILLER AMP
160fH VCO
4.43 MHz VXO
SP/EP
SUB CONV
PB MAIN CONV
BPF 201
BPF 202
X201
R207 VXO
LPF 201
EQ 201
XB 201
Q204
Q205
Q202
Q201
Q203
TP 205 REC COL
TP 207 PB COL
LPF 202
R214 REC COL LEVEL
Q203, Q204, Q205 2SC1740S(RS)
Q201, Q202 DTC144ES
TP110 VIDEO OUT
Q106
Q107
EQ102
Q105
Q113
To A
D111 MA27W(A)
Q105 2SC1740S(RS)
Q106, Q107 2SA1309R,S
Q113 DTC144YS
Q112 2SC2021R,S
IC 103 TA7374P
SERCH
P/D
VCO
JP101
VIDEO SUB BOARD ASS'Y
Q252
Q214
Q213
Q213, Q214, Q252 2SC1740S(RS)
DL 201
CN103
GND
UNSW 12V
VIDEO
NC
AUDIO
GND
From / To 0 8 TUNER CTL CN 2
From / To 4 3 PRE / REC CN 1
CN101
SYNC
GND
PB FM
REC FM
GND
GND
REC COL
PB COL
TP214 SECAM DET
TP GND
TP106 PB FM
COLOR ↔ B/W
B/W — COLOR — SW
CN106
CN251
JP251
IC251 BA7007
COMP 2
COMP 1
AMP
DET
LIMIT AMP
Q251 2SC1740S(RS)
R257 SECAM DET
TP251 SECAM DET
L251
CF251
4 4 SECAM DETECTOR
A
B
C
D
E
F
G
H
1
2
3
4
5

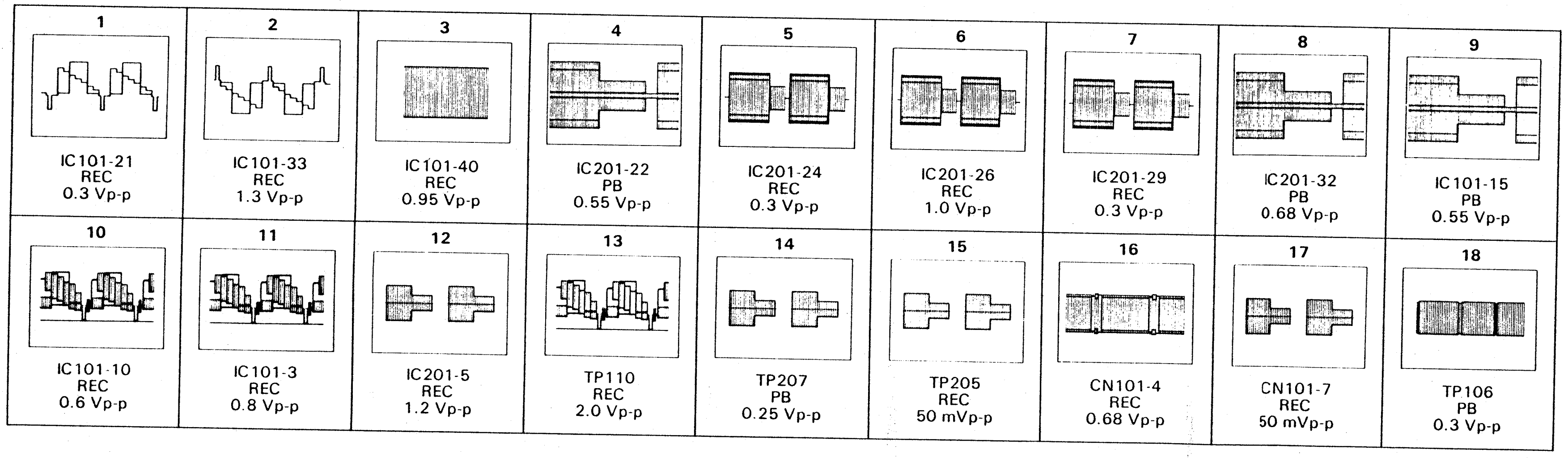
NOTE: Shaded (▨) parts are critical for safety. Replace only with specified part numbers.

3.19 MAIN AND VIDEO SUB CIRCUIT BOARDS

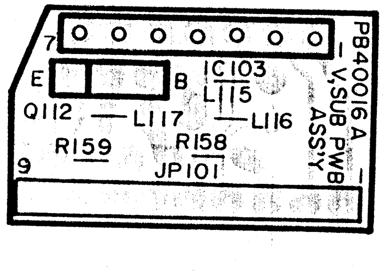
—MAIN—


PB10084A-01
MAIN PWB ASS'Y
JVC575V0
R430
PB SW POINT
R41
AUDIO BIAS
R112
NOISE CANCEL
BALANCE
R127
PB FREQUENCY
RESPONSE
R207
VXO
R434
V PULSE
POSITION
R214
REC COLOR
LEVEL
R33
AUDIO
PB LEVEL
VIDEO IN
VIDEO OUT
AUDIO IN
AUDIO OUT

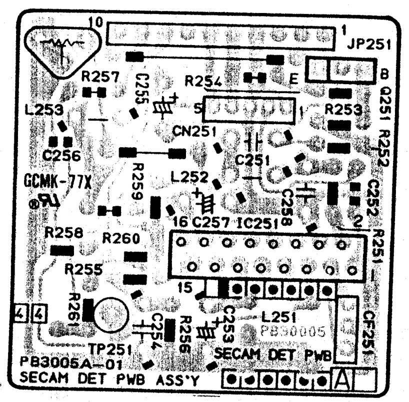
—Waveforms of VIDEO circuit—



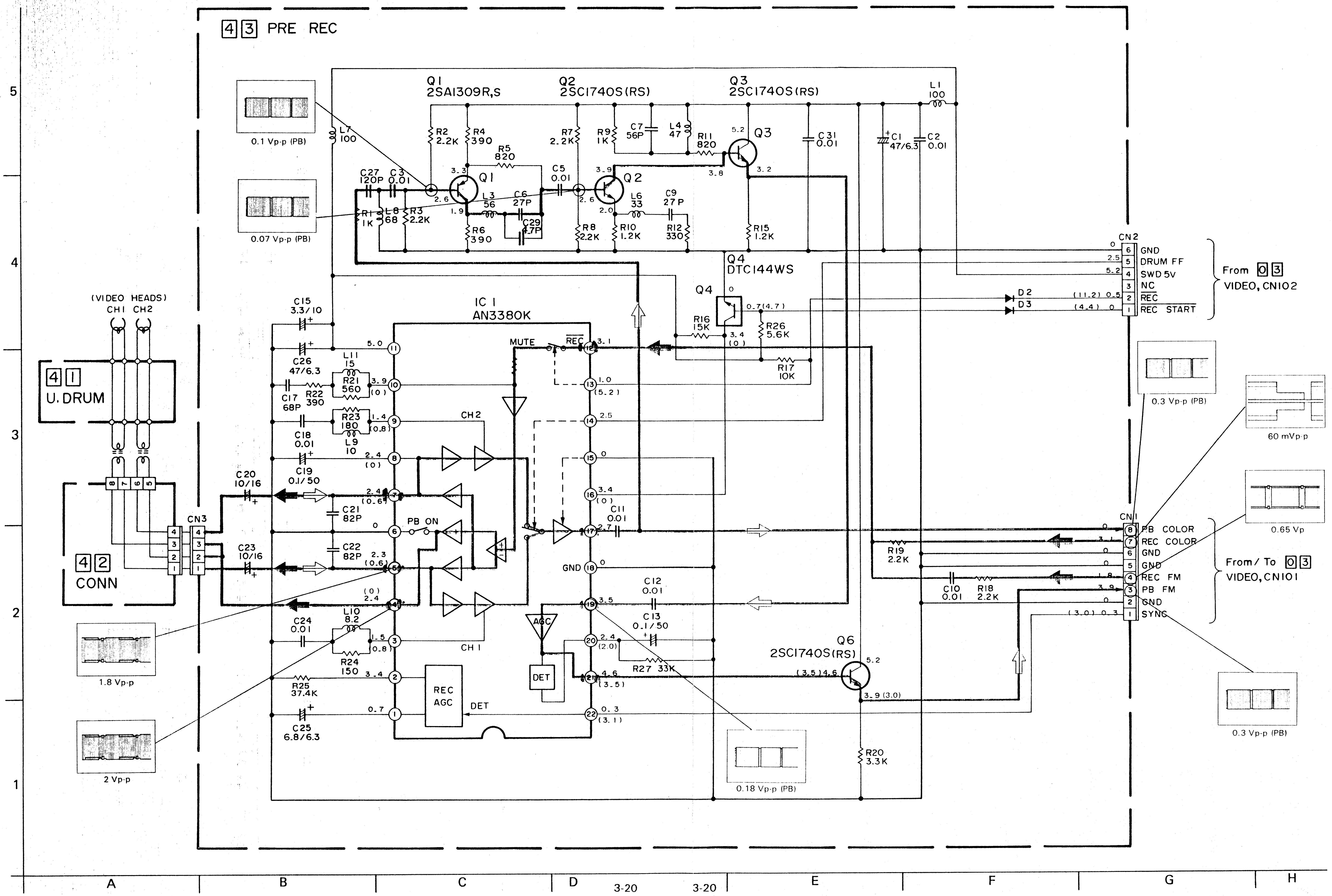
—VIDEO SUB—


PB40016A
V.SUB PWB
ASS'Y
Q112
L117
L116
IC103
L115
R159
R158
JP101

—SECAM DETECTOR—

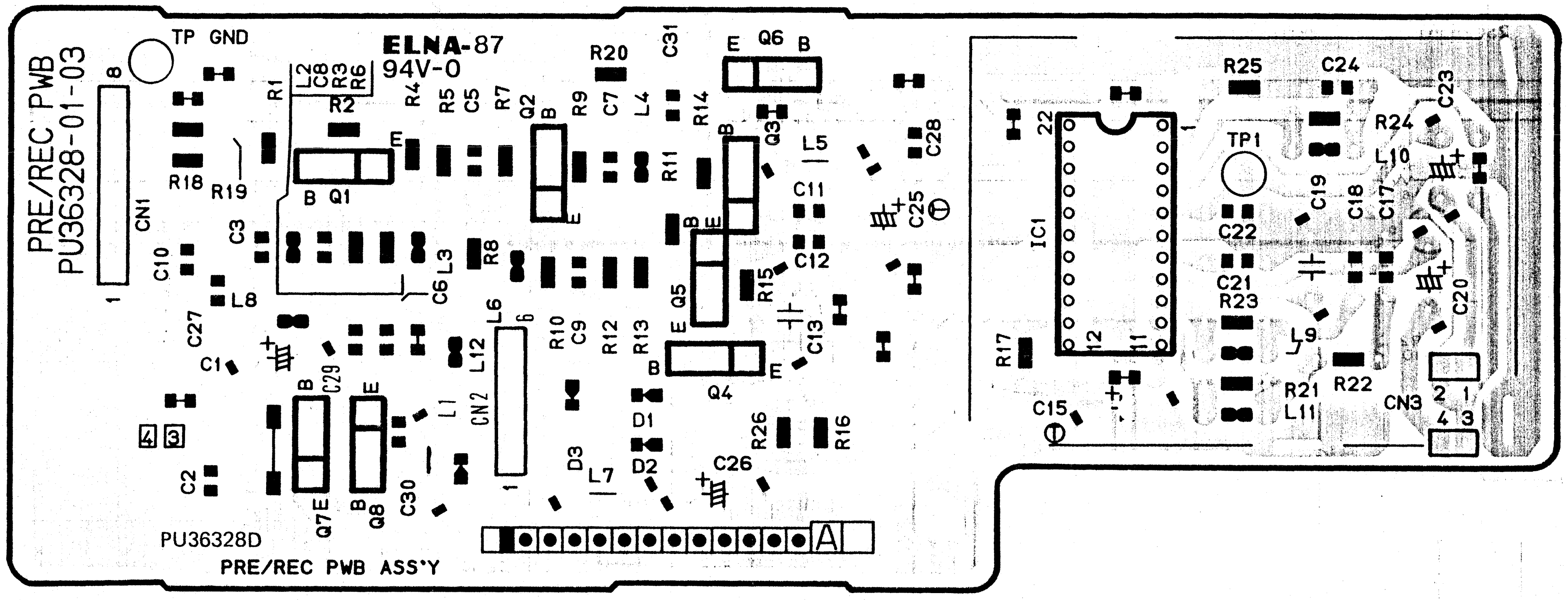

PB3005A-01
SECAM DET PWB ASS'Y
JP251
CN251
IC251
TP251
GCMK-77X

3.20 PRE/REC SCHEMATIC DIAGRAM


4 3 PRE REC
Q1 2SA1309R,S
Q2 2SC1740S(RS)
Q3 2SC1740S(RS)
Q4 DTC144WS
Q6 2SC1740S(RS)
IC 1 AN3380K
L1 100
L7 100
R2 2.2K
R4 390
R5 820
R7 2.2K
R9 1K
C7 56P
L4 47
R11 820
C31 0.01
C1 47/6.3
C2 0.01
C27 120P
C3 0.01
C5 0.01
R1 1K
L8 68
R3 2.2K
L3 56
C6 27P
C29 4.7P
R6 390
L6 33
C9 27P
R8 2.2K
R10 1.2K
R12 330
R15 1.2K
R16 15K
R26 5.6K
R17 10K
D2
D3
C15 3.3/10
C26 47/6.3
L11 15
R21 560
C17 68P
R22 390
R23 180
C18 0.01
L9 10
C19 0.1/50
C20 10/16
C21 82P
C22 82P
C23 10/16
C24 0.01
L10 8.2
R24 150
R25 37.4K
C25 6.8/6.3
C11 0.01
C12 0.01
C13 0.1/50
R27 33K
R19 2.2K
C10 0.01
R18 2.2K
R20 3.3K
MUTE
REC
PB ON
CH1
CH2
AGC
DET
REC AGC
GND
(VIDEO HEADS)
CH1 CH2
4 1 U. DRUM
4 2 CONN
CN3
CN2
6 GND
5 DRUM FF
4 SWD 5V
3 NC
2 REC
1 REC START
From 0 3 VIDEO, CN102
CN1
8 PB COLOR
7 REC COLOR
6 GND
5 GND
4 REC FM
3 PB FM
2 GND
1 SYNC
From/ To 0 3 VIDEO, CN101
0.1 Vp-p (PB)
0.07 Vp-p (PB)
0.3 Vp-p (PB)
60 mVp-p
0.65 Vp
0.3 Vp-p (PB)
0.18 Vp-p (PB)
1.8 Vp-p
2 Vp-p
5
4
3
2
1
A
B
C
D
E
F
G
H

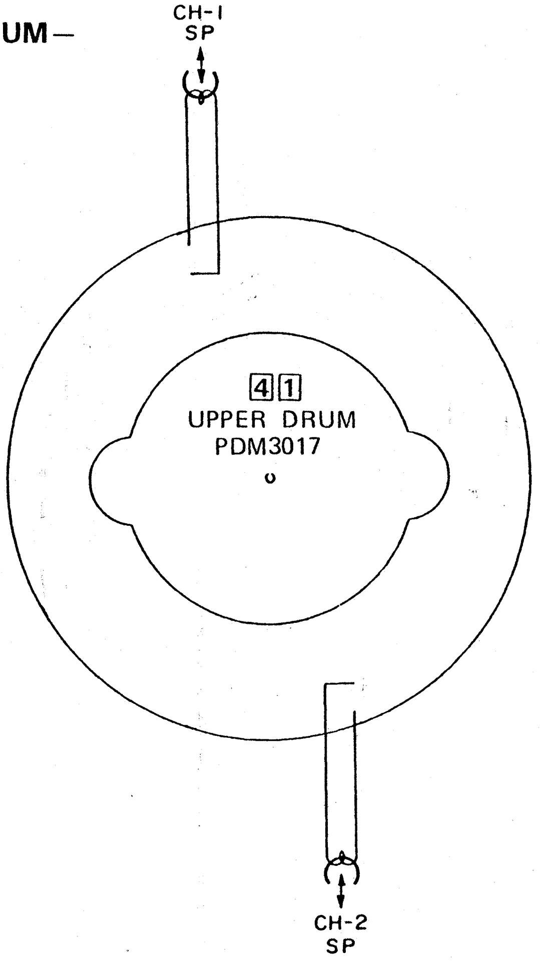
3.21 PRE/REC AND UPPER DRUM CIRCUIT BOARDS

—PRE/REC—



PRE/REC PWB
PU36328-01-03
TP GND
ELNA-87
94V-0
CN1
R1
L2
C8
R3
R6
R2
R4
R5
C5
R7
Q2
R9
C7
L4
R14
R20
C31
E Q6 B
Q1
R18
R19
C3
C10
L8
C27
C1
L3
C6
R8
L6
L12
CN2
L1
C29
Q7
Q8
C30
R10
C9
R12
R13
Q5
Q4
D1
D2
D3
L7
R26
R16
C26
R11
Q3
L5
C11
C12
R15
C13
C25
C28
C2
4 3
IC1
22
12
11
1
R17
C15
R25
C24
C23
R24
L10
TP1
C19
C18
C17
C22
C21
R23
C20
L9
R21
L11
R22
CN3
2 1
4 3
PU36328D
PRE/REC PWB ASS'Y
A

—UPPER DRUM—

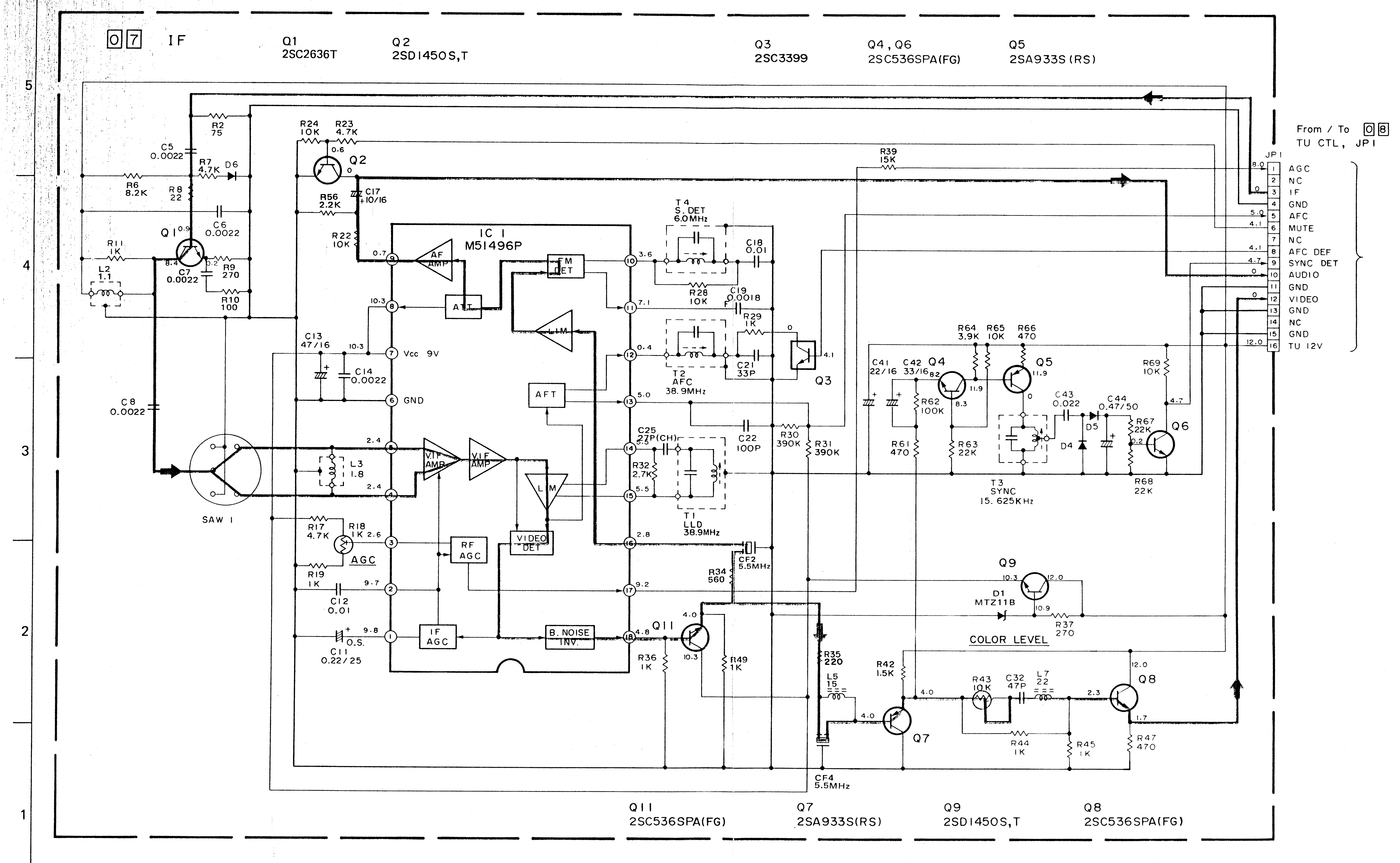


CH-1
SP
4 1
UPPER DRUM
PDM3017
CH-2
SP

5
4
3
2
1

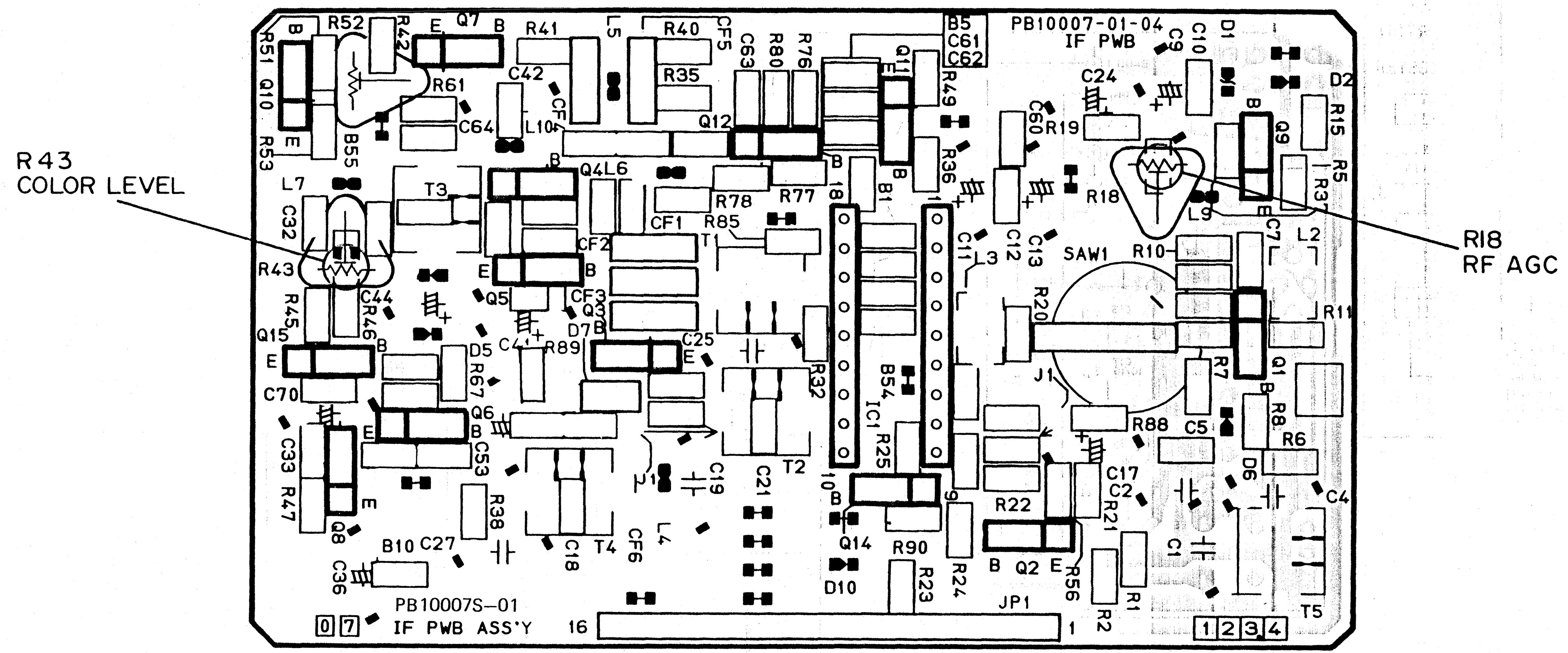
A B C D E F G H

3.22 IF SCHEMATIC DIAGRAM


07 IF
Q1 2SC2636T
Q2 2SD1450S,T
Q3 2SC3399
Q4, Q6 2SC536SPA(FG)
Q5 2SA933S(RS)
Q11 2SC536SPA(FG)
Q7 2SA933S(RS)
Q9 2SD1450S,T
Q8 2SC536SPA(FG)
From / To 08 TU CTL, JP1
JP1
1 AGC
2 NC
3 IF
4 GND
5 AFC
6 MUTE
7 NC
8 AFC DEF
9 SYNC DET
10 AUDIO
11 GND
12 VIDEO
13 GND
14 NC
15 GND
16 TU 12V
IC 1 M51496P
AF AMP
ATT
FM DET
LIM
AFT
VIF AMP
VIF AMP
LIM
VIDEO DET
RF AGC
IF AGC
B. NOISE INV.
Vcc 9V
GND
T4 S. DET 6.0MHz
T2 AFC 38.9MHz
T1 LLD 38.9MHz
T3 SYNC 15.625KHz
CF2 5.5MHz
CF4 5.5MHz
SAW 1
AGC
COLOR LEVEL
D1 MTZ11B
D4
D5
D6
R2 75
R6 8.2K
R7 4.7K
R8 22
R9 270
R10 100
R11 1K
L2 1.1
C5 0.0022
C6 0.0022
C7 0.0022
C8 0.0022
R24 10K
R23 4.7K
R56 2.2K
R22 10K
C17 10/16
C13 47/16
C14 0.0022
L3 1.8
R17 4.7K
R18 1K
R19 1K
C12 0.01
C11 0.22/25
O.S.
C18 0.01
R28 10K
C19 0.0018
R29 1K
C21 33P
R39 15K
C25 27P(CH)
R32 2.7K
C22 100P
R30 390K
R31 390K
R34 560
R36 1K
R49 1K
R35 220
L5 15
R64 3.9K
R65 10K
R66 470
C41 22/16
C42 33/16
R62 100K
R61 470
R63 22K
C43 0.022
C44 0.47/50
R67 22K
R68 22K
R69 10K
R37 270
R42 1.5K
R43 10K
C32 47P
L7 22
R44 1K
R45 1K
R47 470
5
4
3
2
1
A
B
C
D
E
F
G
H

NOTE: Voltage are DC-measured with a digital voltmeter during REC mode.

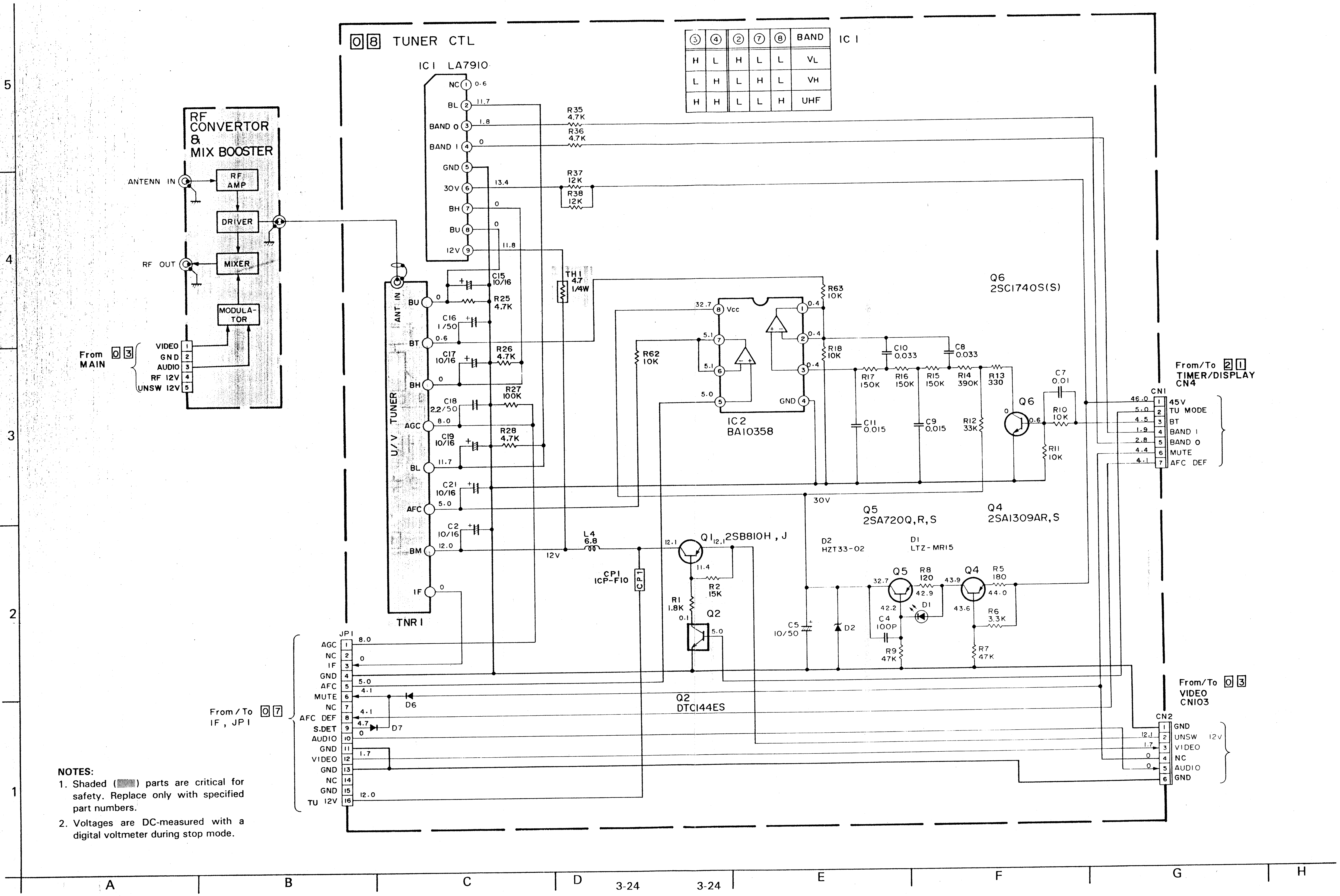
3.23 IF CIRCUIT BOARD


R43
COLOR LEVEL

R18
RF AGC

PB10007-01-04
IF PWB
PB10007S-01
IF PWB ASS'Y
07
16
JP1
1
1 2 3 4
SAW1
IC1
T1
T2
T3
T4
T5
J1
B5
C61
C62
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
Q14
Q15
R41
R40
R35
R52
R42
R61
R51
R53
B55
L5
L6
L7
L9
L10
L2
L3
L4
CF1
CF2
CF3
CF5
CF6
C63
R80
R76
R49
R36
R19
C60
C24
C9
C10
D1
D2
R15
R5
R3
C7
R10
R11
R20
R7
R8
R6
R88
C5
D6
C4
C1
C2
C17
R21
R22
R56
R1
R2
R23
R24
R90
D10
R25
B54
B1
R32
C25
C19
C21
C18
C27
B10
C36
R38
C53
R67
D5
D7
R89
C44
R45
R46
C70
C33
R47
C32
C42
C64
R78
R77
R85
C11
C12
C13
C3
R43
R18
5
4
3
2
1
A
B
C
D
E
F
G

3.24 TUNER CTL SCHEMATIC DIAGRAM


08 TUNER CTL
IC1 LA7910
NC 1 0.6
BL 2 11.7
BAND 0 3 1.8
BAND 1 4 0
GND 5
30V 6 13.4
BH 7 0
BU 8 0
12V 9 11.8
R35 4.7K
R36 4.7K
R37 12K
R38 12K
TH1 4.7 1/4W
RF CONVERTOR & MIX BOOSTER
ANTENN IN
RF AMP
DRIVER
MIXER
RF OUT
MODULA-TOR
From 03 MAIN
VIDEO 1
GND 2
AUDIO 3
RF 12V 4
UNSW 12V 5
ANT IN
U/V TUNER
TNR1
BU
BT
BH
AGC
BL
AFC
BM
IF
C15 10/16
R25 4.7K
C16 1/50
C17 10/16
R26 4.7K
R27 100K
C18 2.2/50
C19 10/16
R28 4.7K
C21 10/16
C2 10/16
L4 6.8
12V
CP1 ICP-F10
IC2 BA10358
Vcc
R62 10K
R63 10K
R18 10K
C10 0.033
C8 0.033
R17 150K
R16 150K
R15 150K
R14 390K
R13 330
C11 0.015
C9 0.015
R12 33K
C7 0.01
R10 10K
R11 10K
Q6 2SC1740S(S)
Q1 2SB810H, J
R1 1.8K
R2 15K
Q2 DTC144ES
30V
Q5 2SA720Q,R,S
Q4 2SA1309AR,S
D2 HZT33-02
D1 LTZ-MR15
R8 120
R5 180
C4 100P
R9 47K
R6 3.3K
R7 47K
C5 10/50
D6
D7
From/To 21 TIMER/DISPLAY CN4
CN1
1 45V
2 TU MODE
3 BT
4 BAND 1
5 BAND 0
6 MUTE
7 AFC DEF
From/To 03 VIDEO CN103
CN2
1 GND
2 UNSW 12V
3 VIDEO
4 NC
5 AUDIO
6 GND
JP1
1 AGC
2 NC
3 IF
4 GND
5 AFC
6 MUTE
7 NC
8 AFC DEF
9 S.DET
10 AUDIO
11 GND
12 VIDEO
13 GND
14 NC
15 GND
16 TU 12V
From/To 07 IF, JP1
1
2
3
4
5
A
B
C
D
E
F
G
H

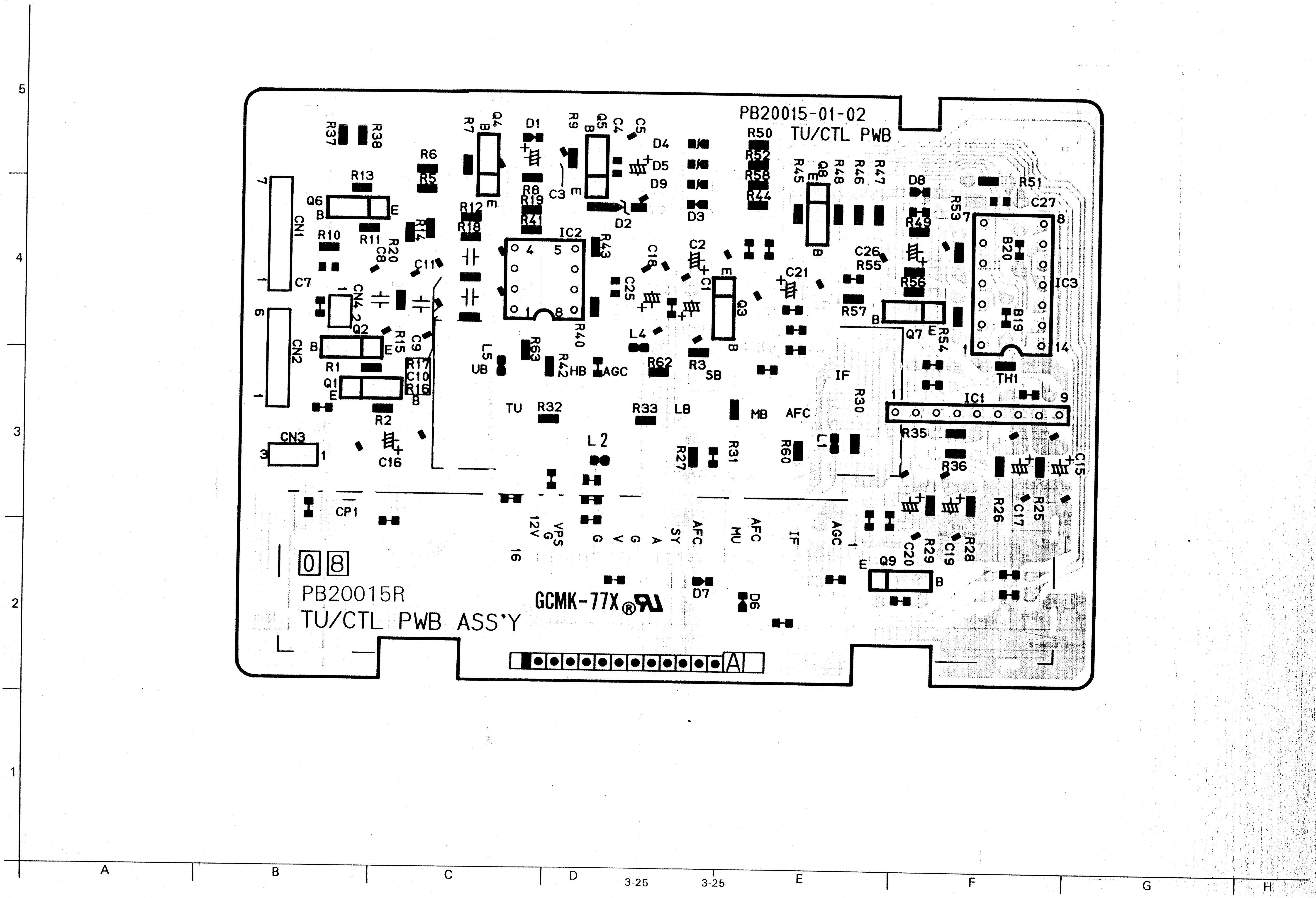
③	④	②	⑦	⑧	BAND
H	L	H	L	L	VL
L	H	L	H	L	VH
H	H	L	L	H	UHF

IC 1

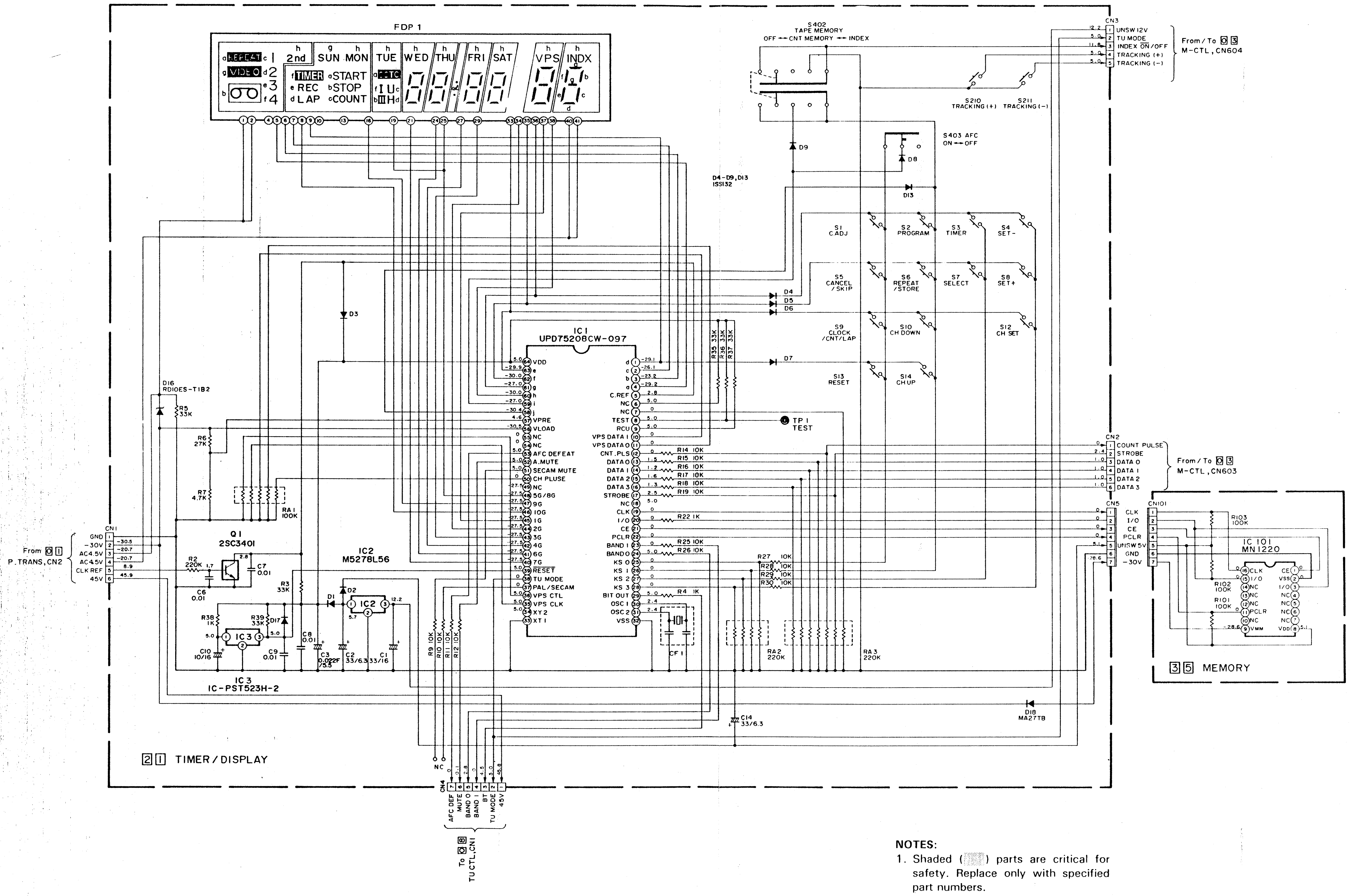
NOTES:

1. Shaded (▨) parts are critical for safety. Replace only with specified part numbers.
2. Voltages are DC-measured with a digital voltmeter during stop mode.

3.25 TUNER CTL CIRCUIT BOARD


PB20015-01-02
TU/CTL PWB
PB20015R
TU/CTL PWB ASS'Y
GCMK-77X
08
CN1
CN2
CN3
CN4
CP1
IC1
IC2
IC3
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
D1
D2
D3
D4
D5
D6
D7
D8
D9
L1
L2
L4
L5
TH1
12V
VPS
G
V
A
SY
AFC
MU
IF
AGC
TU
UB
HB
LB
MB
SB
1
2
3
4
5
A
B
C
D
E
F
G
H
3-25
3-25

3.26 TIMER/DISPLAY AND MEMORY SCHEMATIC DIATRAMS

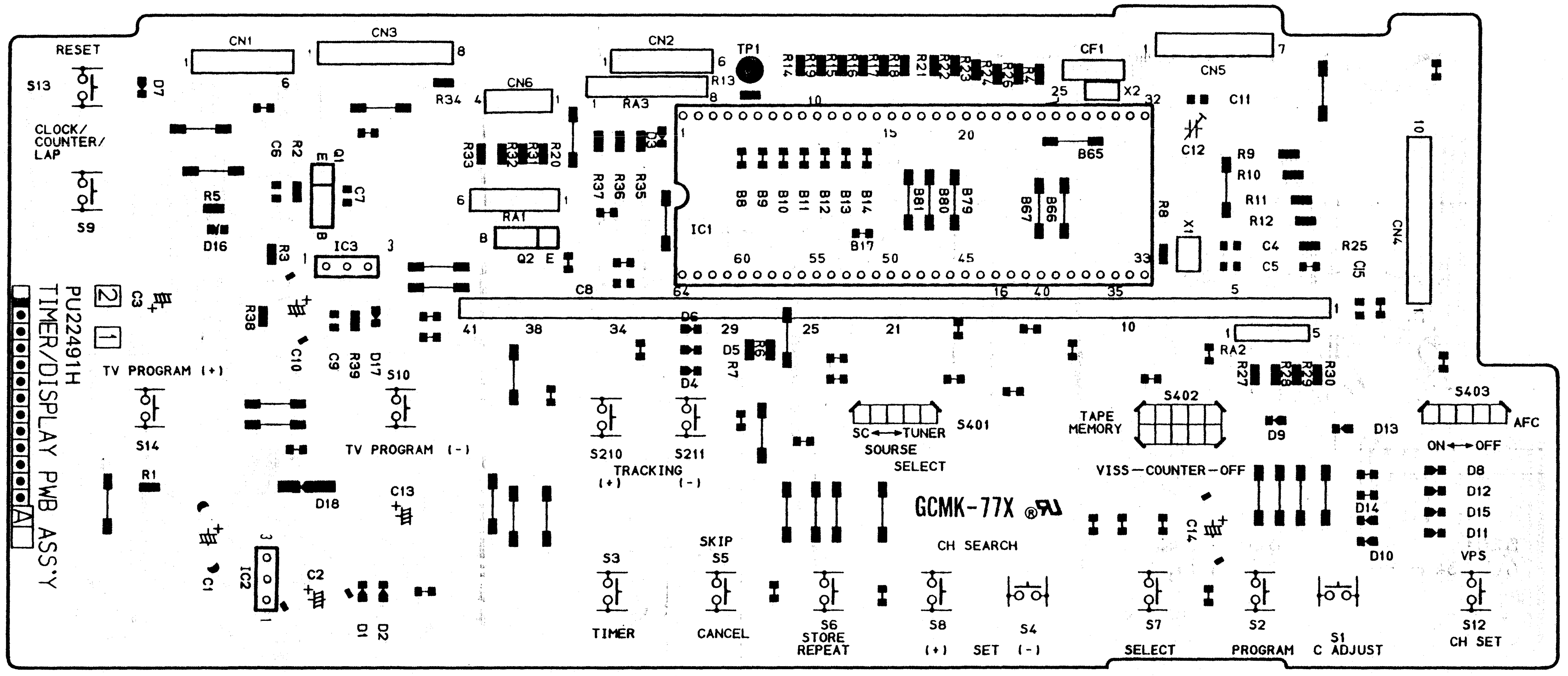

FDP 1
REPEAT
VIDEO
2nd
SUN MON TUE WED THU FRI SAT
VPS INDX
TIMER
START
REC
STOP
LAP
COUNT
S402 TAPE MEMORY
OFF ↔ CNT MEMORY ↔ INDEX
CN3
UNSW 12V
TU MODE
INDEX ON/OFF
TRACKING (+)
TRACKING (−)
From / To 03 M-CTL, CN604
S210 TRACKING (+)
S211 TRACKING (−)
S403 AFC ON ↔ OFF
D9
D8
D13
D4-D9, D13 ISS132
S1 C.ADJ
S2 PROGRAM
S3 TIMER
S4 SET−
S5 CANCEL /SKIP
S6 REPEAT /STORE
S7 SELECT
S8 SET+
S9 CLOCK /CNT/LAP
S10 CH DOWN
S12 CH SET
S13 RESET
S14 CH UP
D4
D5
D6
D7
D3
R35 33K
R36 33K
R37 33K
IC1 UPD75208CW-097
VDD
VPRE
VLOAD
NC
AFC DEFEAT
A.MUTE
SECAM MUTE
CH PLUSE
5G/8G
9G
10G
1G
2G
3G
4G
6G
7G
RESET
TU MODE
PAL/SECAM
VPS CTL
VPS CLK
XT 2
XT 1
C.REF
TEST
RCU
VPS DATA I
VPS DATA O
CNT.PLS
DATA 0
DATA 1
DATA 2
DATA 3
STROBE
CLK
I/O
CE
PCLR
BAND 1
BAND 0
KS 0
KS 1
KS 2
KS 3
BIT OUT
OSC 1
OSC 2
VSS
TP 1 TEST
R14 10K
R15 10K
R16 10K
R17 10K
R18 10K
R19 10K
R22 1K
R25 10K
R26 10K
R27 10K
R28 10K
R29 10K
R30 10K
R4 1K
CF 1
RA 2 220K
RA 3 220K
CN2
COUNT PULSE
STROBE
DATA 0
DATA 1
DATA 2
DATA 3
From / To 03 M-CTL, CN603
CN5
CLK
I/O
CE
PCLR
UNSW 5V
GND
−30V
CN101
R103 100K
IC 101 MN1220
R102 100K
R101 100K
VMM
VDD
35 MEMORY
D16 RDIOES-T1B2
R5 33K
R6 27K
R7 4.7K
RA 1 100K
CN1
GND
−30V
AC4.5V
AC4.5V
CLK REF
45V
From 01 P.TRANS, CN2
Q1 2SC3401
R2 220K
C6 0.01
C7 0.01
R3 33K
IC2 M5278L56
D1
D2
R38 1K
R39 33K
D17
IC3
C10 10/16
C9 0.01
C8 0.01
C3 0.022F /5.5
C2 33/6.3
C1 33/16
IC 3 IC-PST523H-2
R9 10K
R10 10K
R11 10K
R12 10K
C14 33/6.3
D18 MA27TB
21 TIMER / DISPLAY
NC
CN4
AFC DEF
MUTE
BAND 0
BAND 1
BT
TU MODE
45V
To 08 TU CTL, CN1
5
4
3
2
1
A
B
C
D
E
F
G
H

NOTES:

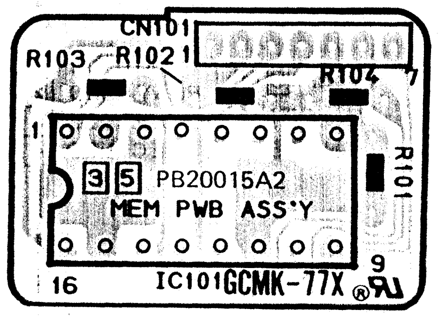
1. Shaded (▨) parts are critical for safety. Replace only with specified part numbers.
2. Voltages are DC-measured with a digital voltmeter during stop mode.

3.27 TIMER/DISPLAY, OPERATION AND MEMORY CIRCUIT BOARDS

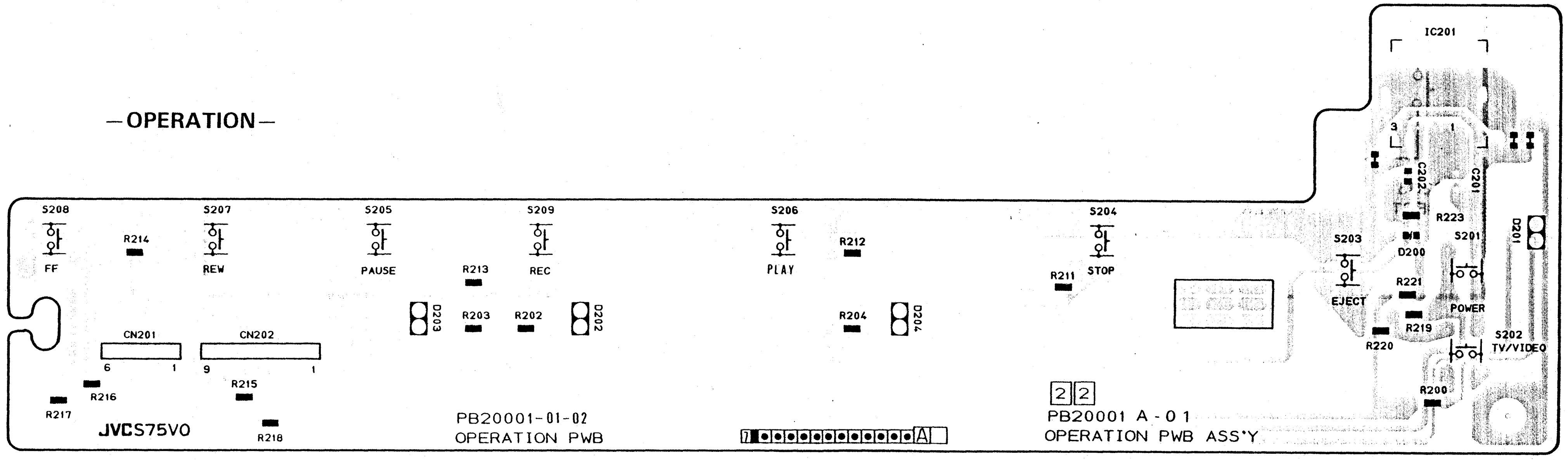
—TIMER/DISPLAY—


RESET
S13
CLOCK/ COUNTER/ LAP
S9
CN1
CN3
CN2
CN6
CN5
CN4
TP1
CF1
X1
X2
IC1
IC2
IC3
RA1
RA2
RA3
Q1
Q2
B65
B67
B17
PU22491H
TIMER/DISPLAY PWB ASS'Y
TV PROGRAM (+)
S14
TV PROGRAM (-)
S10
S210
S211
TRACKING
(+)
(-)
SC←→TUNER
SOURSE
SELECT
S401
TAPE MEMORY
S402
S403
AFC
ON←→OFF
VISS—COUNTER—OFF
GCMK-77X
CH SEARCH
S3
TIMER
SKIP
S5
CANCEL
S6
STORE
REPEAT
S8
(+)
SET
(-)
S4
S7
SELECT
S2
PROGRAM
S1
C ADJUST
VPS
S12
CH SET
D8
D12
D15
D11
D14
D10
D9
D13
D16
D18

—MEMORY—


CN101
R103
R102
R104
R101
35
PB20015A2
MEM PWB ASS'Y
16
9
IC101
GCMK-77X

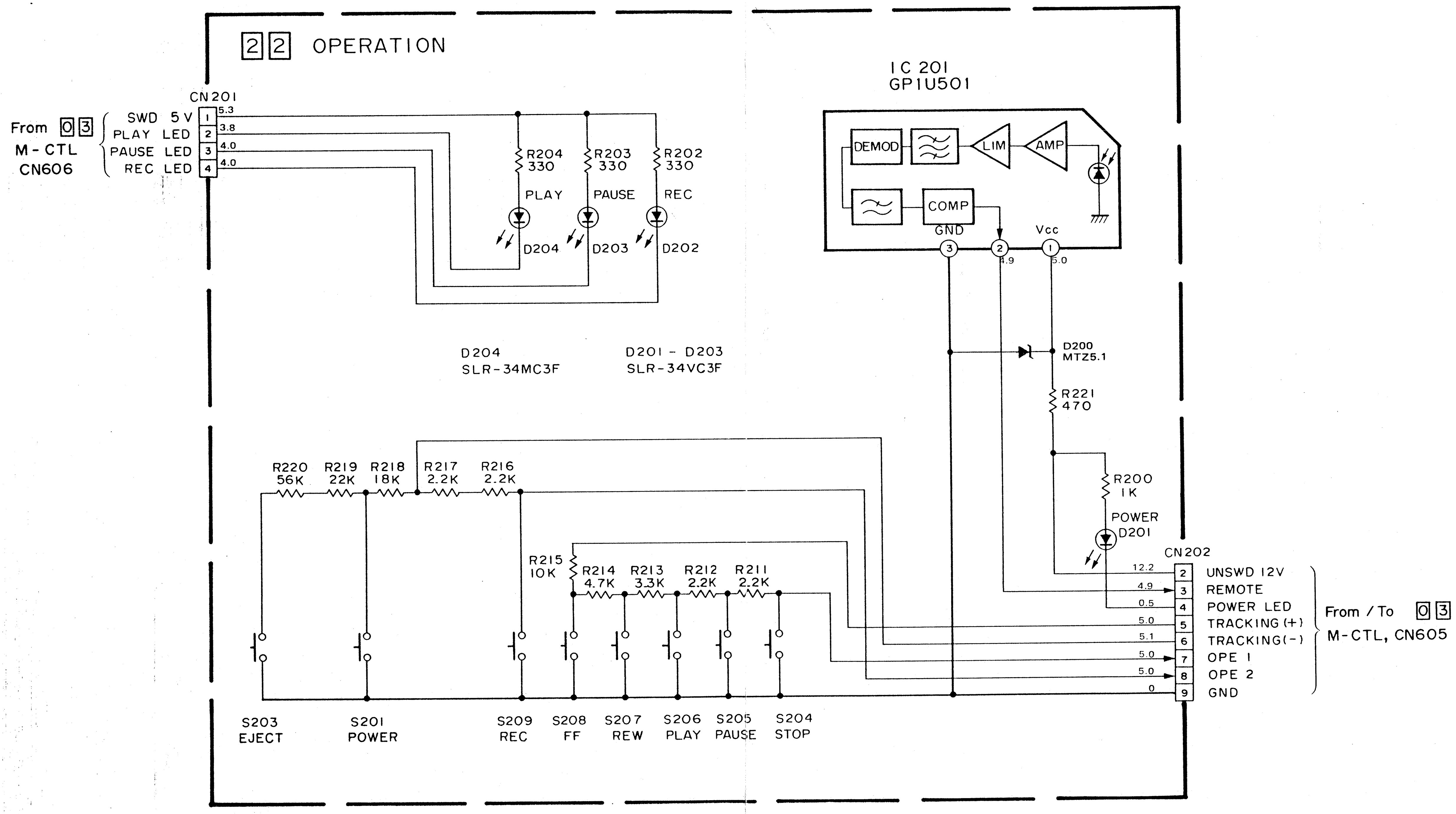
—OPERATION—


IC201
S208
FF
S207
REW
S205
PAUSE
S209
REC
S206
PLAY
S204
STOP
S203
EJECT
S201
POWER
S202
TV/VIDEO
D200
D201
D202
D203
D204
R214
R213
R203
R202
R212
R204
R211
R223
R221
R219
R220
R200
CN201
CN202
R216
R217
R215
R218
JVCS75V0
PB20001-01-02
OPERATION PWB
22
PB20001 A-01
OPERATION PWB ASS'Y

5
4
3
2
1

A B C D E F G H

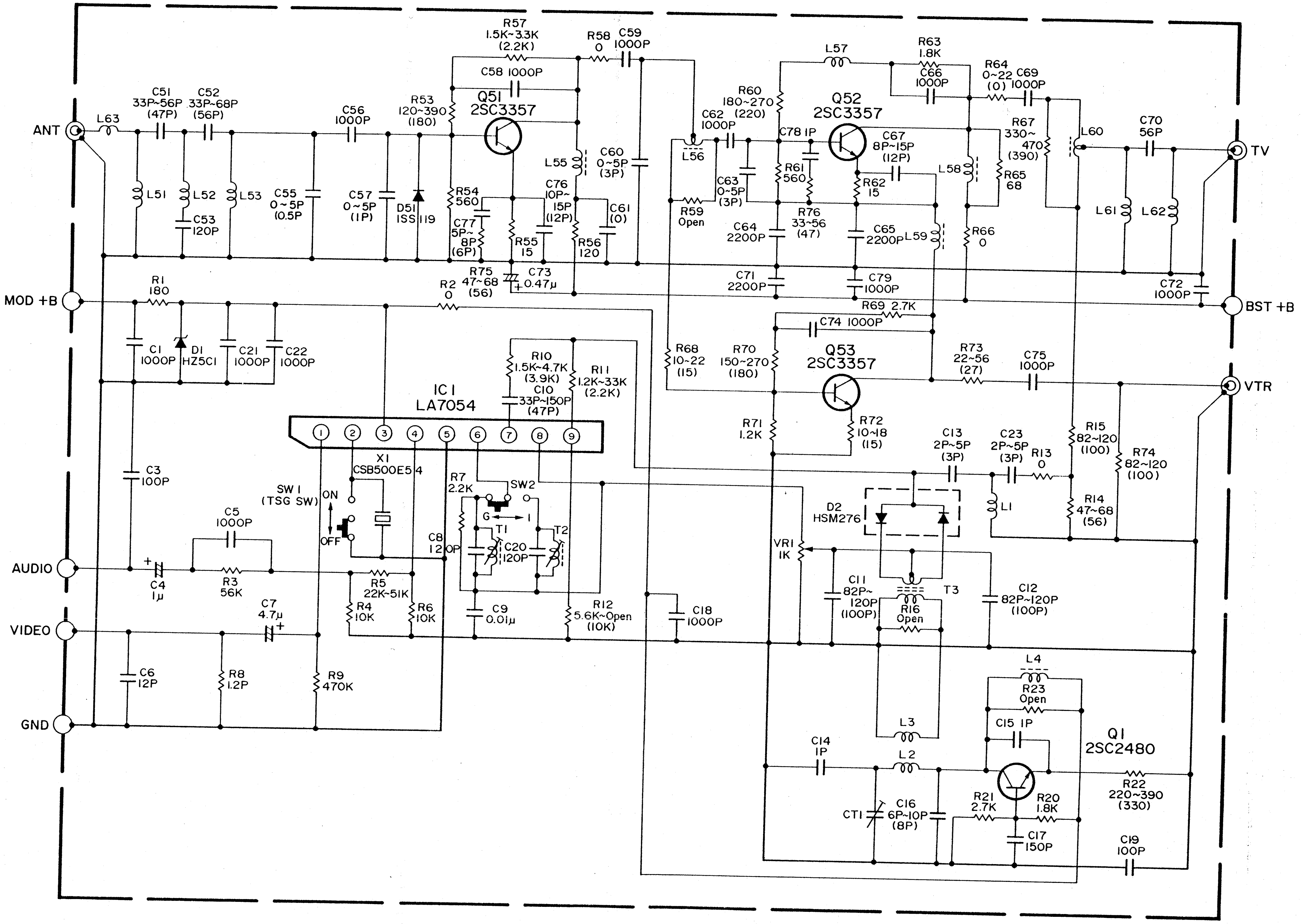
3.28 OPERATION SCHEMATIC DIAGRAM



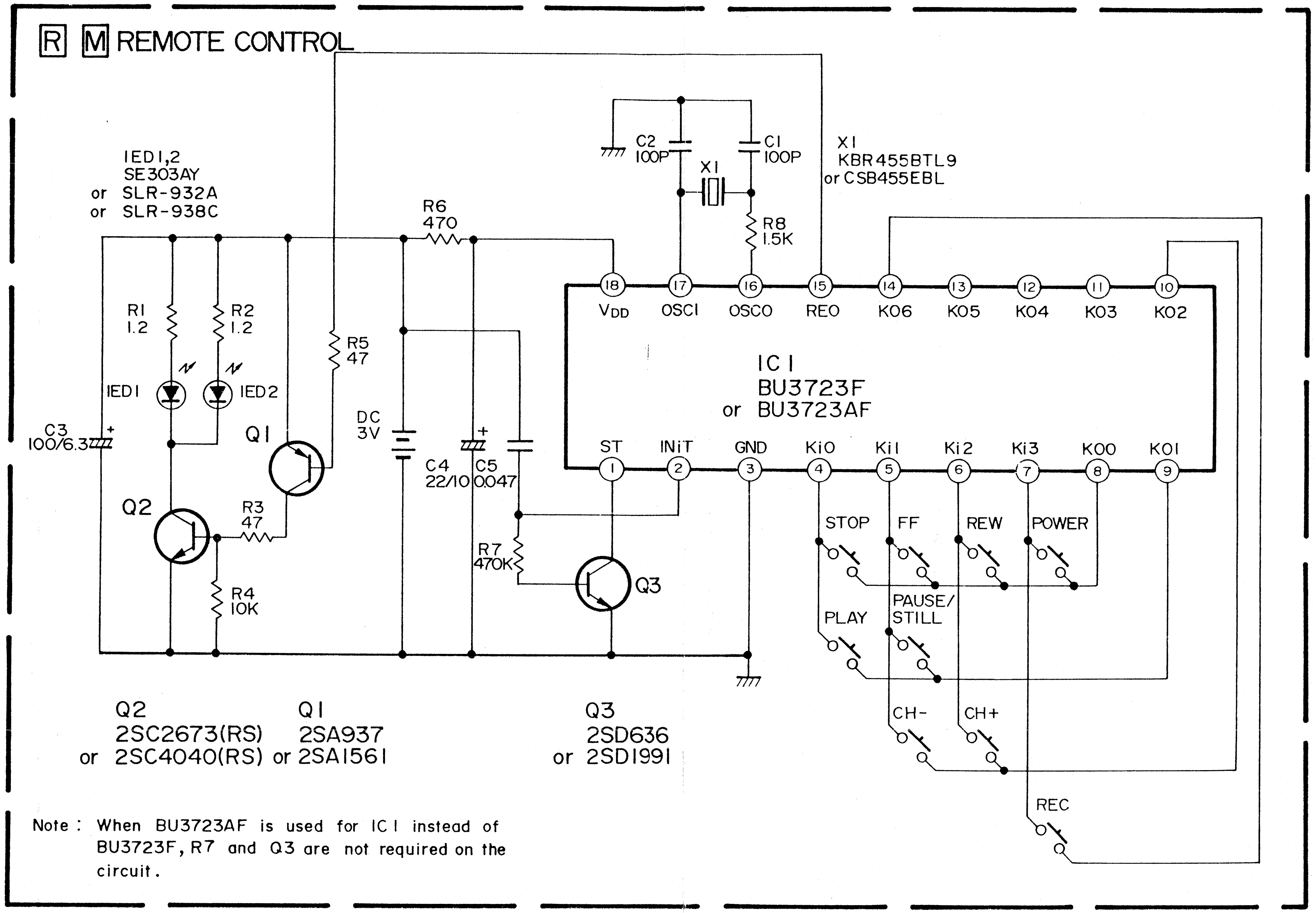
2 2 OPERATION
From 0 3 M-CTL CN606
SWD 5V
PLAY LED
PAUSE LED
REC LED
CN201
5.3
3.8
4.0
4.0
R204 330
R203 330
R202 330
PLAY
PAUSE
REC
D204
D203
D202
D204 SLR-34MC3F
D201 - D203 SLR-34VC3F
IC 201 GP1U501
DEMOD
LIM
AMP
COMP
GND
Vcc
4.9
5.0
D200 MTZ5.1
R221 470
R200 1K
POWER D201
R220 56K
R219 22K
R218 18K
R217 2.2K
R216 2.2K
R215 10K
R214 4.7K
R213 3.3K
R212 2.2K
R211 2.2K
S203 EJECT
S201 POWER
S209 REC
S208 FF
S207 REW
S206 PLAY
S205 PAUSE
S204 STOP
CN202
12.2
4.9
0.5
5.0
5.1
5.0
5.0
0
UNSWD 12V
REMOTE
POWER LED
TRACKING (+)
TRACKING(-)
OPE 1
OPE 2
GND
From / To 0 3 M-CTL, CN605

NOTE: Voltages are DC-measured with a digital voltmeter during stop mode.

3.29 RF CONVERTER AND MIX BOOSTER SCHEMATIC DIAGRAM


ANT
MOD +B
AUDIO
VIDEO
GND
TV
BST +B
VTR
L63
C51 33P~56P (47P)
C52 33P~68P (56P)
L51
L52
L53
C53 120P
C55 0~5P (0.5P)
C56 1000P
C57 0~5P (1P)
D51 1SS119
R53 120~390 (180)
Q51 2SC3357
R57 1.5K~3.3K (2.2K)
C58 1000P
R58 0
C59 1000P
R54 560
C77 5P~8P (6P)
R55 15
C76 10P~15P (12P)
L55
C60 0~5P (3P)
C61 (0)
R56 120
R75 47~68 (56)
C73 0.47μ
R2 0
R1 180
C1 1000P
D1 HZ5C1
C21 1000P
C22 1000P
IC1 LA7054
R10 1.5K~4.7K (3.9K)
R11 1.2K~33K (2.2K)
C10 33P~150P (47P)
C3 100P
X1 CSB500E5 4
SW1 (TSG SW)
ON
OFF
C5 1000P
R3 56K
C4 1μ
R5 22K~51K
R4 10K
R6 10K
C8 120P
R7 2.2K
SW2
G
I
T1
T2
C20 120P
C9 0.01μ
R12 5.6K~Open (10K)
C18 1000P
C7 4.7μ
C6 12P
R8 1.2P
R9 470K
L56
R59 Open
C62 1000P
R60 180~270 (220)
C78 1P
Q52 2SC3357
L57
R63 1.8K
C66 1000P
R64 0~22 (0)
C69 1000P
C67 8P~15P (12P)
R61 560
C63 0~5P (3P)
R62 15
R76 33~56 (47)
C64 2200P
C65 2200P
L59
L58
R67 330~470 (390)
R65 68
R66 0
L60
C70 56P
L61
L62
C71 2200P
C79 1000P
C72 1000P
R69 2.7K
C74 1000P
R68 10~22 (15)
R70 150~270 (180)
Q53 2SC3357
R73 22~56 (27)
C75 1000P
R71 1.2K
R72 10~18 (15)
C13 2P~5P (3P)
C23 2P~5P (3P)
R13 0
R15 82~120 (100)
R74 82~120 (100)
R14 47~68 (56)
L1
D2 HSM276
VR1 1K
C11 82P~120P (100P)
T3
R16 Open
C12 82P~120P (100P)
L4
R23 Open
C15 1P
Q1 2SC2480
L3
C14 1P
L2
CT1
C16 6P~10P (8P)
R21 2.7K
R20 1.8K
C17 150P
R22 220~390 (330)
C19 100P

NOTE: This schematic parts are critical for safety.
Replace only with specified part numbers.


R M REMOTE CONTROL
IED1,2
SE303AY
or SLR-932A
or SLR-938C
R6
470
C2
100P
C1
100P
X1
X1
KBR455BTL9
or CSB455EBL
R8
1.5K
R1
1.2
R2
1.2
R5
47
IED1
IED2
C3
100/6.3
Q1
DC
3V
C4
22/10
C5
0.047
Q2
R3
47
R4
10K
R7
470K
Q3
18 VDD
17 OSCI
16 OSCO
15 REO
14 KO6
13 KO5
12 KO4
11 KO3
10 KO2
IC1
BU3723F
or BU3723AF
ST 1
INIT 2
GND 3
Ki0 4
Ki1 5
Ki2 6
Ki3 7
KO0 8
KO1 9
STOP
FF
REW
POWER
PLAY
PAUSE/
STILL
CH-
CH+
REC
Q2
2SC2673(RS)
or 2SC4040(RS)
Q1
2SA937
or 2SA1561
Q3
2SD636
or 2SD1991

Note : When BU3723AF is used for IC1 instead of BU3723F, R7 and Q3 are not required on the circuit.

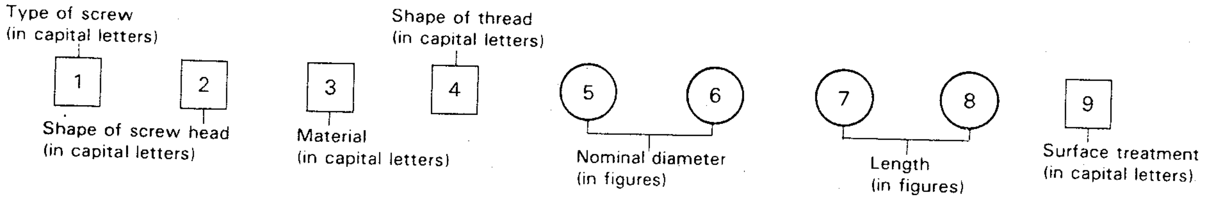
NOTE: This schematic parts are critical for safety.
Replace only with specified part numbers.

SECTION 4
EXPLODED VIEWS AND PARTS LIST

4.1 STANDARD PART NUMBER CODING

4.1.1 Screw coding

Standard screw part numbers are as follows.

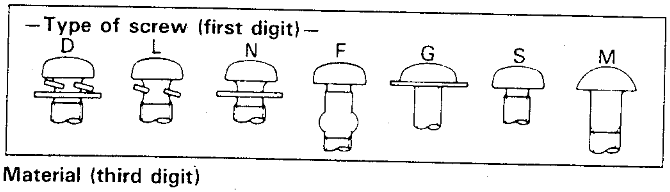

Type of screw
(in capital letters)
Shape of thread
(in capital letters)
1
2
3
4
5
6
7
8
9
Shape of screw head
(in capital letters)
Material
(in capital letters)
Nominal diameter
(in figures)
Length
(in figures)
Surface treatment
(in capital letters)

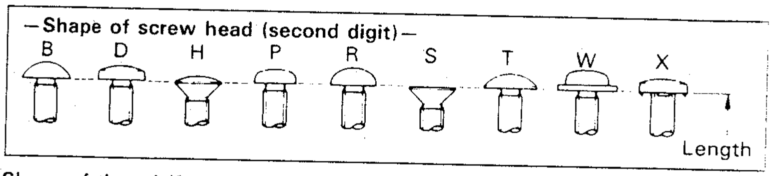
Type of screw (first digit)

S	Normal screws
D	Assembled machine screws (with plain and spring washers)
L	〃 (with spring washer)
N	〃 (with plain washer)
F	Feather screws
G	Washer head tapping screws
M	Wood screws

Shape of screw head (second digit)

B	Brazier head
D	Binding head
H	Oval countersunk head
P	Pan head
R	Round head
S	Flat head
T	Truss head
W	Washer head (machine screws)
X	Toothed head


—Type of screw (first digit)—
D
L
N
F
G
S
M

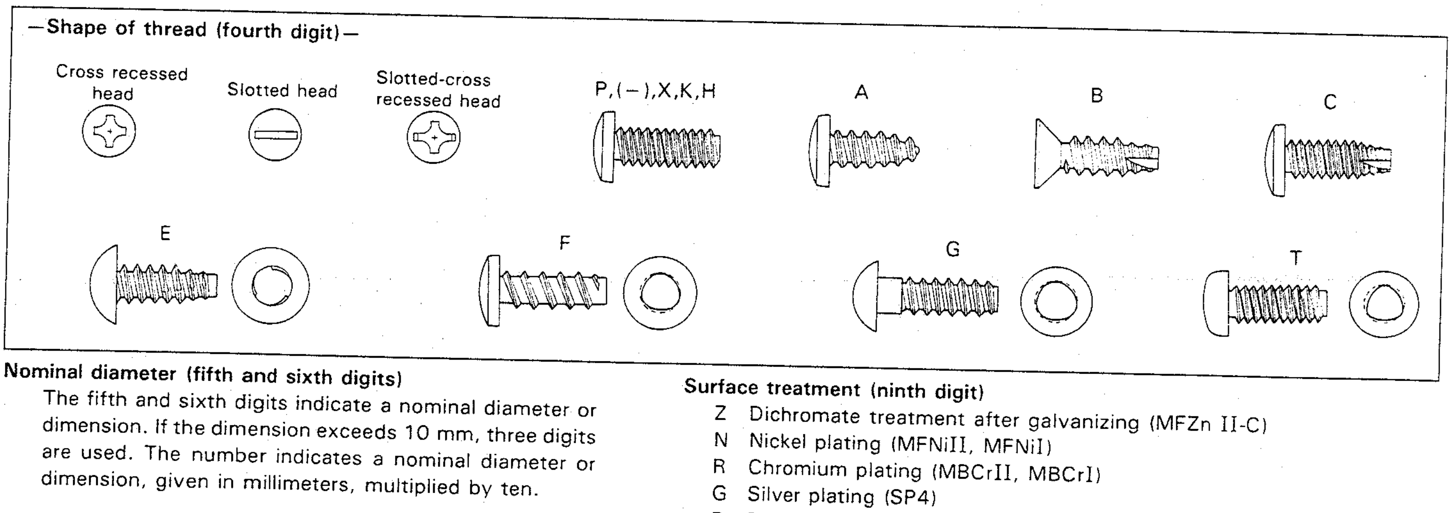

—Shape of screw head (second digit)—
B
D
H
P
R
S
T
W
X
Length

Material (third digit)

S	Steel
E	Stainless steel
C	Cast iron
U	Copper
B	Brass
P	Phosphor bronze
N	Nickel silver
Y	Cast brass
A	Aluminum
Z	Zinc alloy
K	Polycarbonate

Shape of thread (fourth digit)

P	Cross recessed head screws
(−)	Slotted head machine screws
X	Slotted-cross recessed head machine screws
K	Cross recessed head machine screws for precision equipment (type 1
H	〃 (type 3
A	Cross recessed head tapping screws (type 1)
B	〃 (type 2)
C	〃 (type 3)
E	Cross recessed head special tapping screws (brand : evertight)
F	〃 (brand : P-tight)
T	〃 (brand : taptight)
G	〃


—Shape of thread (fourth digit)—
Cross recessed head
Slotted head
Slotted-cross recessed head
P,(−),X,K,H
A
B
C
E
F
G
T

Nominal diameter (fifth and sixth digits)

The fifth and sixth digits indicate a nominal diameter or dimension. If the dimension exceeds 10 mm, three digits are used. The number indicates a nominal diameter or dimension, given in millimeters, multiplied by ten.

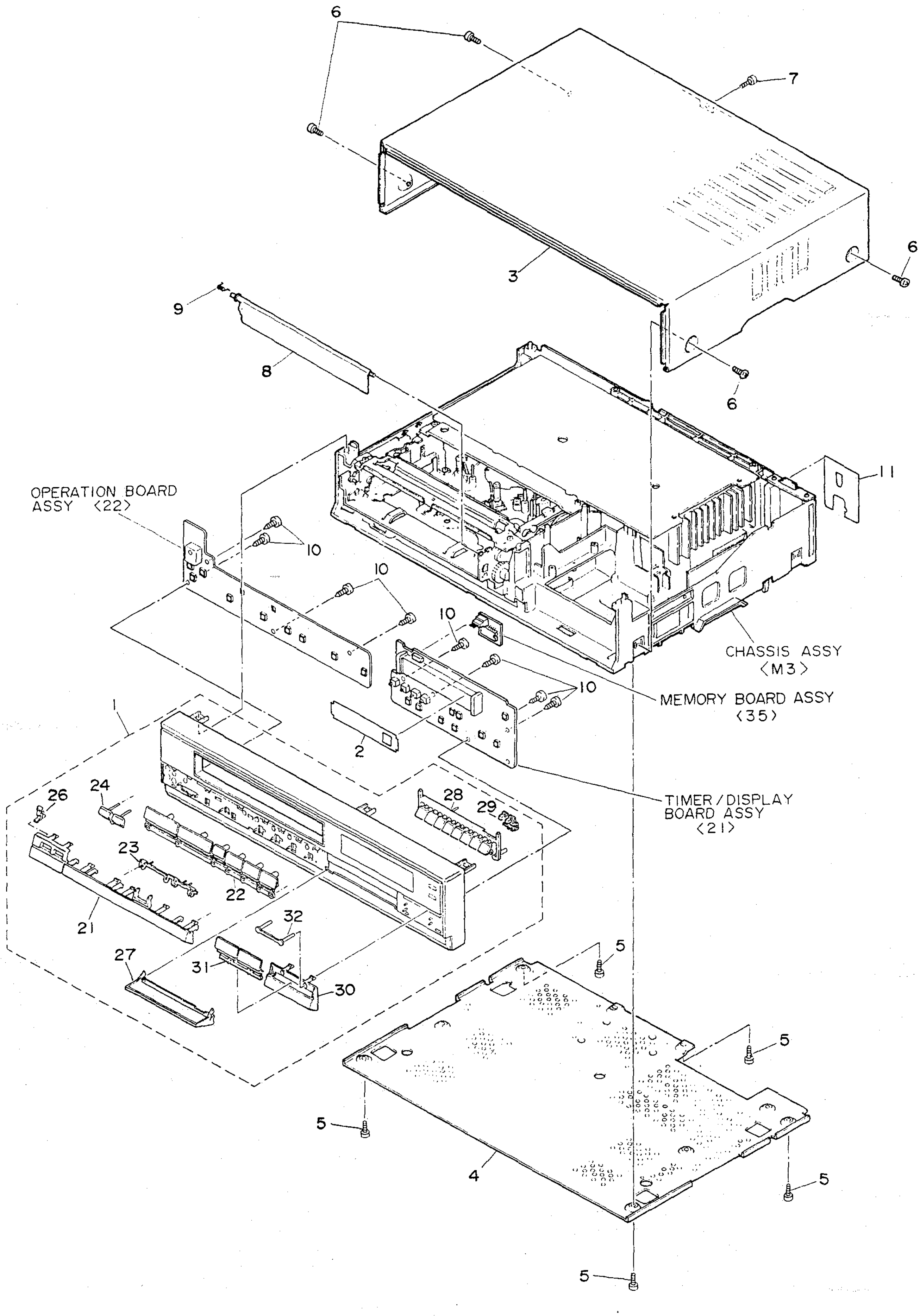
Length (seventh and eighth digits)

The seventh and eighth digits indicate length in millimeters. The preceding figure is zero when the dimension is smaller than 10 mm. For machine screws used in precision equipment whose length is given in units of 0.1 mm, the number indicates ten times the size of their length.

Surface treatment (ninth digit)

Z	Dichromate treatment after galvanizing (MFZn II-C)
N	Nickel plating (MFNiII, MFNiI)
R	Chromium plating (MBCrII, MBCrI)
G	Silver plating (SP4)
B	Black coating after plating
F	Blackening of iron (FB)
M	Blackening after galvanizing
K	Pickling of brass (PF2)
P	Phosphate treatment
W	Uni-chrome plating
L	Coated with transparent paint
A	Colored red after galvanizing (MFZnII-C)
C	Colored blue after galvanizing (MFZzII-C)
T	Colored green after galvanizing (MFZnII-C)
V	Colored purple after galvanizing (MFZnII-C)

4.2 CABINET ASSEMBLY <M2>



6
7
3
6
9
8
6
11
OPERATION BOARD ASSY <22>
10
10
10
10
CHASSIS ASSY <M3>
MEMORY BOARD ASSY <35>
1
2
TIMER / DISPLAY BOARD ASSY <21>
26
24
28
29
23
22
21
32
27
31
30
5
5
5
4
5
5

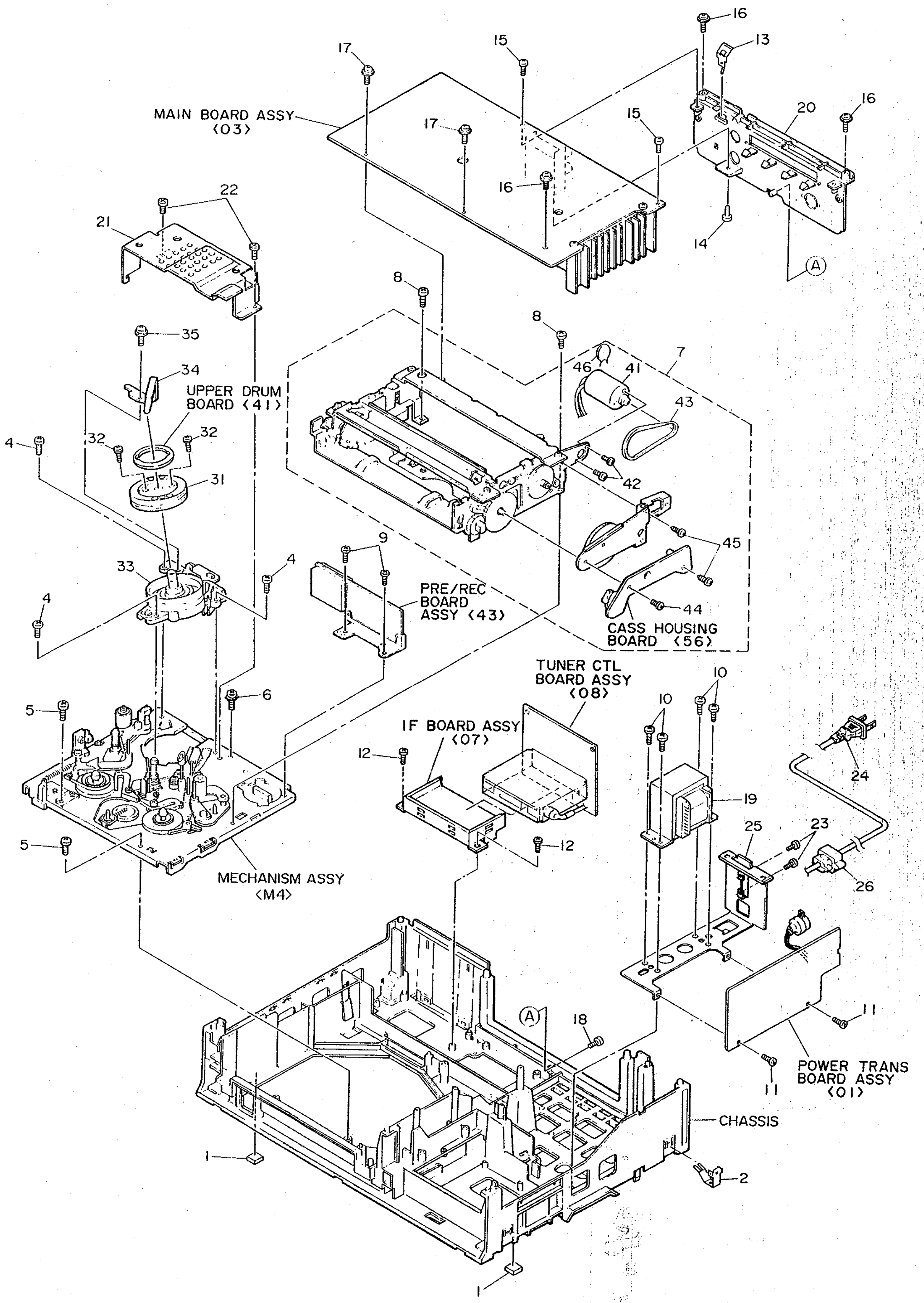
CABINET ASSEMBLY <M2>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	1	PQ10479M	FRONT PANEL ASSY,INCL.21-32
	2	PQ42382-2	SHEET
⚠	3	PQ10473-2-5	TOP COVER
⚠	4	PQ10472-1-2	BOTTOM COVER
	5	SDSF3008Z	TAPPING SCREW,X5
	6	SDSA4014M	TAPPING SCREW,X4
	7	SDSF3010M	TAPPING SCREW
	8	PQ31267-84	CASSETTE HOUSING DOOR
	9	PQ42410-1-1	TORSION SPRING
	10	SDSF2608Z	TAPPING SCREW,X8
⚠	11	PQ32058	BRACKET SHEET
	21	PQ20436-4	OPERATION COVER
	22	PQ20294-3	OPERATION BUTTON
	23	PQ31227	OPERATION INDICATOR
	24	PQ31204-3	POWER BUTTON
	26	PQ42355	POWER INDICATOR
	27	PQ31228AD	DOOR ASSY
	28	PQ31384-4	PROGRAM BUTTON
	29	PQ31206	COUNTER BUTTON
	30	PQ31702-3	CHANNEL COVER
	31	PQ31703	CHANNEL BUTTON
	32	PQ43015	PIN

CHASSIS ASSEMBLY <M3>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	1	PQ43013	FOOT,X2
	2	PQ43023	EARTH PLATE
	4	SDSP2608Z	SCREW,X3
	5	SDSA4014Z	TAPPING SCREW,X2
	6	PQ41396	SPECIAL SCREW
	7	PUS28277H	CASS.HOUSING ASSY,INCL.41-46
	8	SDST2605Z	TAPPING SCREW,X2
	9	SDST2605Z	TAPPING SCREW,X2
	10	SDSA4014Z	TAPPING SCREW,X4
	11	SDST3006Z	TAPPING SCREW,X2
	12	SDSF3008Z	TAPPING SCREW,X2
	13	PQ43012	EARTH PLATE
	14	SDST2605Z	TAPPING SCREW
	15	SDSA2608Z	TAPPING SCREW,X2
	16	GPSF2610Z	TAPPING SCREW,X3
	17	GPST2608Z	TAPPING SCREW,X2
	18	SDSF3010M	TAPPING SCREW
⚠	19	PU60331	POWER TRANSFORMER,T101
⚠	20	PQ20438-13	TERMINAL BOARD
	21	PQ31171-2-7	D.SHIELD
	22	SDST2605Z	TAPPING SCREW,X2
⚠	23	SPSP3008Z	SCREW,X2
⚠	24	QMP7340-200A	POWER CORD
⚠	25	PQ31670-3	TRANS BRACKET
⚠	26	QHS3771-108	STRAIN RELIEF
	31	PDM2008C	UPPER DRUM ASSY
	32	PDM4001A	DRUM SCREW ASSY,X2
	33	PDM2053C-11	LOWER DRUM MOTOR ASSY
	34	PDM4015A-4	BRUSH ASSY
	35	DPSP2606Z	SCREW
⚠	41	PQ42385A	CASSETTE MOTOR ASSY
⚠	OR	PQ42385B	CASSETTE MOTOR ASSY
	42	SPSP2603Z	SCREW,X2
	43	PQM30003-19	BELT
	44	SPSP2604Z	SCREW
	45	SPST2605Z	TAPPING SCREW,X2
	46	DV710SR223M16	VARISTOR

4.3 CHASSIS ASSEMBLY <M3>


16
13
17
15
20
16
MAIN BOARD ASSY (03)
17
15
16
22
21
14
Ⓐ
8
8
35
34
UPPER DRUM BOARD (41)
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41
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43
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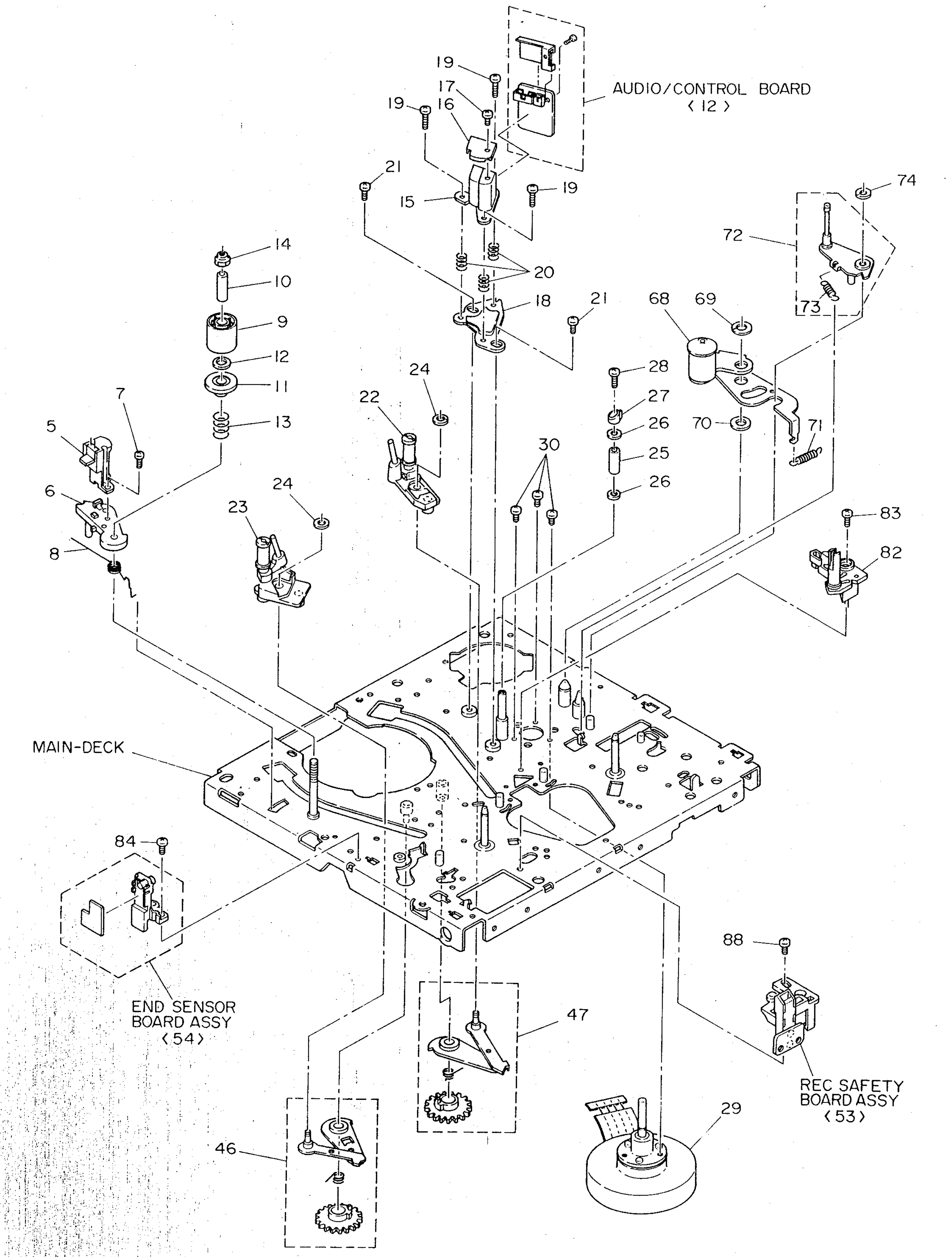
31
42
45
9
33
4
4
PRE/REC BOARD ASSY (43)
44
CASS HOUSING BOARD (56)
TUNER CTL BOARD ASSY (08)
5
6
10
10
IF BOARD ASSY (07)
12
19
24
25
23
5
12
26
MECHANISM ASSY <M4>
Ⓐ
18
11
POWER TRANS BOARD ASSY (01)
11
CHASSIS
1
2
1

4.4 MECHANISM ASSEMBLY <M4>


AUDIO/CONTROL BOARD <12>
19
17
16
19
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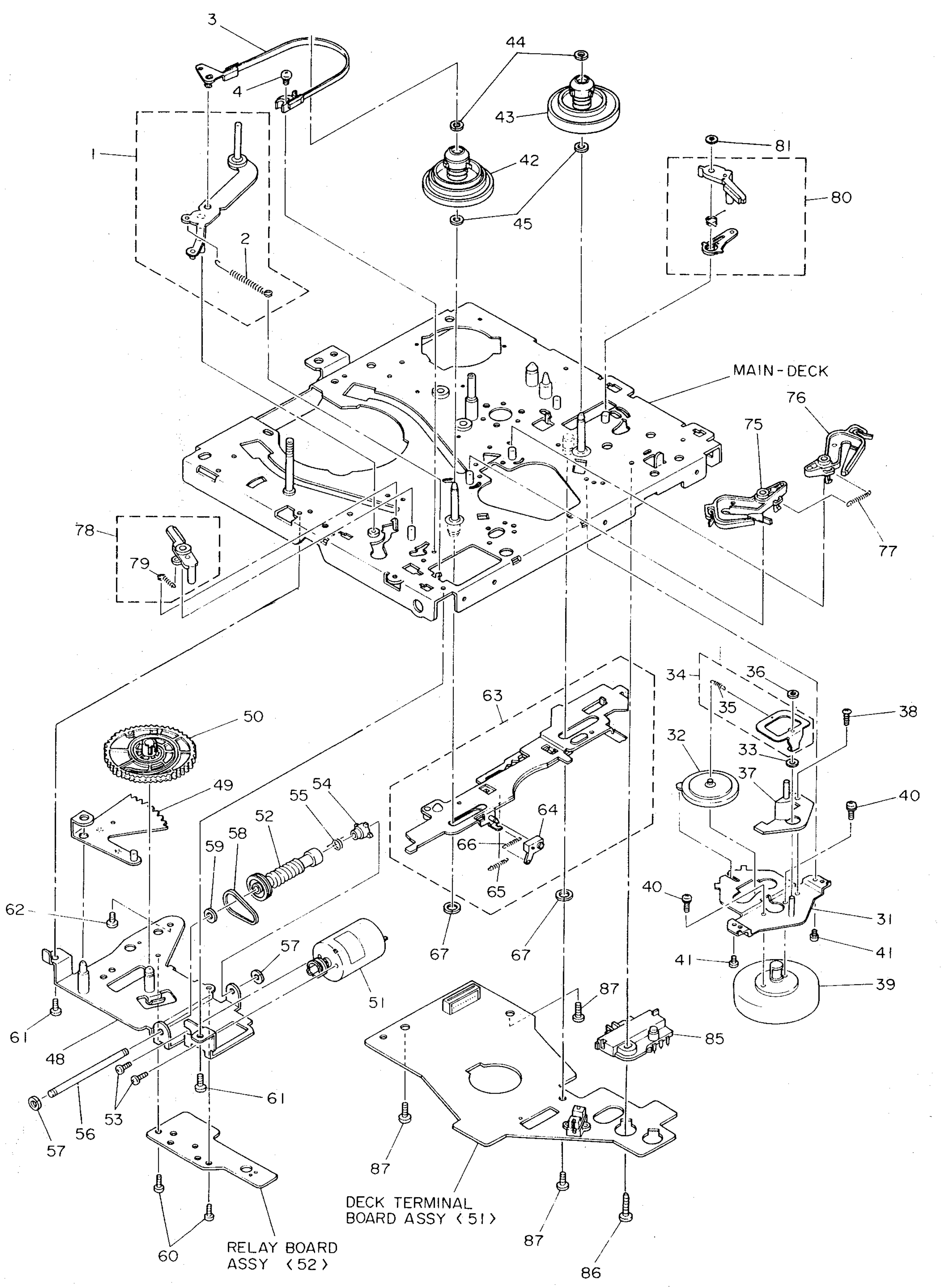
71
72
74
73
83
82
MAIN-DECK
84
END SENSOR BOARD ASSY <54>
47
46
29
88
REC SAFETY BOARD ASSY <53>


3
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44
43
42
45
1
2
81
80
MAIN-DECK
76
75
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63
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36
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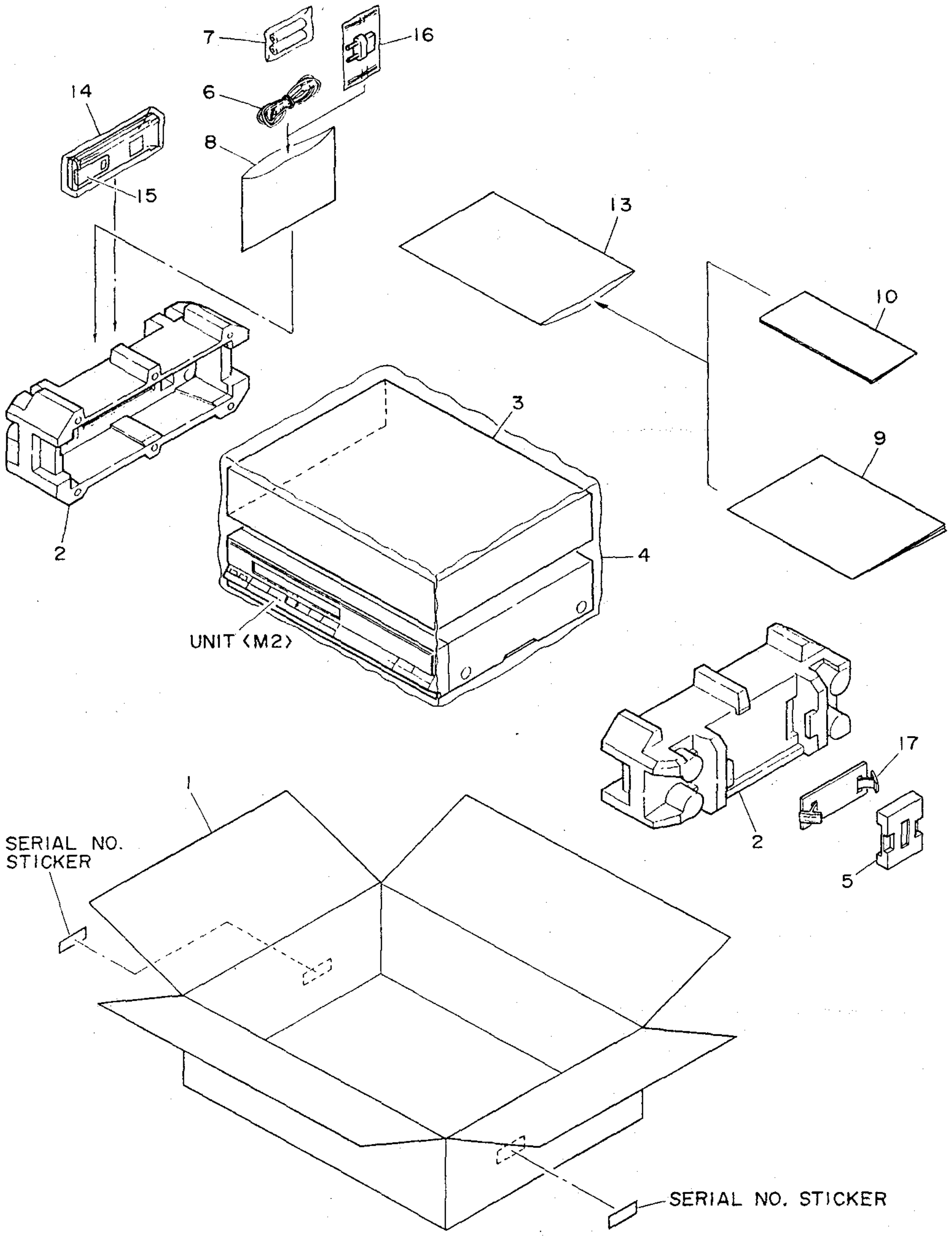
87
85
61
48
61
56
53
57
60
RELAY BOARD ASSY <52>
DECK TERMINAL BOARD ASSY <51>
87
87
86

MECHANISM ASSEMBLY <M4>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	1	PQ41944A-7	TENSION ARM ASSY,INCL.2
	2	PQ41952-3	SPRING
	3	PQ41948A	TENSION BAND ASSY
	4	SDST2606Z	TAPPING SCREW
	5	PU57641-2	FULL ERASE HEAD
	6	PQ31036	FULL ERASE HEAD BASE
	7	SPSG2606Z	TAPPING SCREW
	8	PQ41954-1-1	TORSION SPRING
	9	PQ41955	IMPEDANCE ROLLER
	10	PQ41956	COLLAR
	11	PQ41957	LOWER FLANGE
		OR PQ42958	LOWER FLANGE
	12	PQM30018-39	SPACER
		OR PQM30018-50	SPACER
	13	PQM30002-124	COMPRESSION SPRING
	14	PQ40353	NYLON NUT
	15	PU59253	AUDIO/CONTROL HEAD
	16	PU55535	SHIELD CAP
	17	HPSP2015N	SCREW
	18	PQ42984-2	HEAD BASE
	19	SPSP2608Z	SCREW,X3
	20	PU30080-49	SPRING,X3
	21	SDSP2606Z	SCREW,X2
	22	PQ41963A-2	POLE BASE ASSY (TU)
		OR PU59994	POLE BASE ASSY (TU)
		OR PQ43148A	POLE BASE ASSY (TU)
	23	PQ41969A-2	POLE BASE ASSY (SUP)
		OR PU59993	POLE BASE ASSY (SUP)
		OR PQ43147A	POLE BASE ASSY (SUP)
	24	PQM30017-5	SLIT WASHER,X2
	25	PU53629-2	TAPE GUIDE
	26	PQ40268-2	GUIDE FLANGE,X2
	27	PQ42999-2-1	GUIDE POLE CAP
	28	SDSP2006Z	SCREW
⚠	29	PU58635V	CAPSTAN MOTOR
	30	SPSP2605N	SCREW,X3
	31	PQ41974A-3	REEL MOTOR BRACKET ASSY
	32	PU58645-1-4	IDLER ARM
	33	Q03093-834	WASHER
	34	PQ41976A-1	SPRING ARM ASSY,INCL.35
	35	PQ42212-1-4	SPRING
	36	PQM30017-22	SLIT WASHER
	37	PQ41978	HOLDER
	38	SPST2606Z	TAPPING SCREW
⚠	39	PU58636W	REEL MOTOR
⚠		OR PU58636M	REEL MOTOR
	40	LPSP2604Z	SCREW,X2
	41	SPST2606Z	TAPPING SCREW,X2
	42	PU59250-1-2	REEL DISK (SUP)
	43	PU58638-1-2	REEL DISK (TU)
	44	PQM30017-5	SLIT WASHER,X2
	45	Q03093-828	WASHER,X2
	46	PQ41979A-4	LOADING ARM ASSY (SUP)
	47	PQ41985B	LOADING ARM ASSY (TU)
	48	PQ41992A-1	CAM BRACKET SUB ASSY
	49	PQ41994A-2	ARM GEAR ASSY
	50	PQ20250-1-1	CONTROL CAM
⚠	51	PQ41996A	MODE MOTOR ASSY
	52	PQ41998A	WORM ASSY
	53	LPSP2604Z	SCREW,X2
	54	PQ42001	WINDMILL
	55	PQ42002	CLUTCH SPRING
	56	PQ42003	WORM SHAFT
	57	PQM30017-5	SLIT WASHER,X2
	58	PQM30003-20	BELT
	59	PQM30018-22	SPACER
	60	SPST2606Z	TAPPING SCREW,X2
	61	SPST2606Z	TAPPING SCREW,X2
	62	SPSP2603Z	SCREW
	63	PQ42038A-3	PLATE ASSY,INCL.64-66
	64	PQ31044-1-2	LOCK LEVER
	65	PQM30001-191	TENSION SPRING
	66	PQM30001-211	TENSION SPRING
	67	PQM30017-28	SLIT WASHER,X2
	68	PQ42006B	PINCH ROLLER ARM ASSY
	69	PQM30017-28	SLIT WASHER
	70	Q03093-833	WASHER
	71	PQM30001-193	TENSION SPRING
	72	PQ42013B-4	GUIDE ARM ASSY,INCL.73
	73	PQ42029	SPRING
	74	PQM30017-6	SLIT WASHER
	75	PQ42019A-6	MAIN BRAKE ASSY (SUP)
	76	PQ42020B	MAIN BRAKE ASSY (TU)
	77	PQM30001-216	TENSION SPRING
	78	PQ42021A-1	SUB BRAKE ASSY(SUP),INCL.79
	79	PQ42023-1-2	TENSION SPRING
	80	PQ42037A-2	SUB BRAKE ASSY (TU)
	81	PQM30017-6	SLIT WASHER
	82	PU59925-1-1	LED HOLDER,INCL.LED
	83	SPST2606Z	TAPPING SCREW
	84	SPST2606Z	TAPPING SCREW
	85	PU58642	SLIDE ENCODER
	86	SDSP2610Z	SCREW
	87	SDSP2606Z	SCREW,X3
	88	SDST2606Z	TAPPING SCREW

4.5 PACKING ASSEMBLY <M1>


7
16
14
6
8
15
13
10
3
9
2
4
UNIT <M2>
17
1
SERIAL NO. STICKER
2
5
SERIAL NO. STICKER

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
			PACKING ASSEMBLY <M1>
	1	PQ32169	PACKING CASE
	2	PQ31706A-1	CUSHION ASSY
	3	PQ41026-8	PROTECT SHEET
	4	PQM30021-59-11	POLY BAG
	5	PQ32196	CUSHION
⚠	6	PU59168-3	CABLE ASSY
⚠		OR PU59167-3	CABLE ASSY
	7	UM-3DJ2P	BATTERY,X2
	8	QPGA020-02003	POLY BAG
⚠	9	PU30425-948	INSTRUCTIONS
	10	TCN-3379	TAPE CATALOG
	13	QPGA025-03505	POLY BAG
⚠	14	PQ10344AE	REMOTE CONTROLLER,INCL.15
	15	PQ31323	BATTERY CAP
⚠	16	QMC0271-001	CONVERSION PLUG
	17	PQ31424A	HANDLE ASSY

SECTION 5
ELECTRICAL PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

RESISTORS—All resistance values are in ohms (Ω), unless otherwise indicated.

k : 1,000 (Kilo)
M : 1,000,000 (Mega)
Chip R : Chip Resistor
Chip VR : Chip Variable Resistor
Comp. R : Composition Resistor
CR : Carbon Film Resistor
FR : Fusible Resistor
MFR : Metal Film Resistor
MPR : Metal Plate Resistor
OMR : Oxide Metal Film Resistor
PMR : Precision Metal Film Resistor
UFR : Unflammable Resistor
VR : Variable Resistor (Potentiometer)
WR : Wire Wound Resistor

CAPACITORS—All capacitance values are in μF, unless otherwise indicated.

pF : μμF (Pico farad)
C Cap : Ceramic Capacitor
Chip Cap : Chip Capacitor
Chip T Cap : Chip Tantalum Capacitor
E Cap : Electrolytic Capacitor
FM Cap : Film Mica Capacitor
LL Cap : Low Leak Current Electrolytic Capacitor
MM Cap : Metalized Mylar Capacitor
MP Cap : Metalized Paper Capacitor
MY Cap : Mylar Capacitor
NP Cap : Non-polar Capacitor
PC Cap : Polycarbonate Capacitor
PP Cap : Polypropylene Capacitor
PS Cap : Polystyrol Capacitor
T Cap : Tantalum Capacitor
TF Cap : Thin Film Capacitor
TR Cap : Trimmer Capacitor

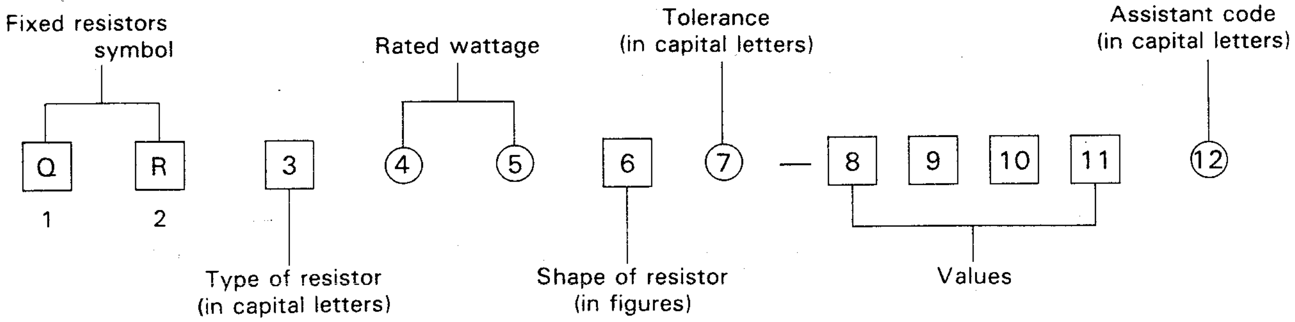
NOTES:

- [M] indicates mechanical symbol number.
- [2 digits] indicates circuit board symbol number.
- "X " indicates quantity per set.

5.1 STANDARD PART NUMBER CODING

5.1.1 Fixed resistor coding

Fixed resistor part numbers are as follows.


Fixed resistors symbol
Rated wattage
Tolerance (in capital letters)
Assistant code (in capital letters)
Q
R
3
④
⑤
6
⑦
—
8
9
10
11
⑫
1
2
Type of resistor (in capital letters)
Shape of resistor (in figures)
Values

Type of resistor (third digit)

C	Composition resistors
D	Carbon film resistors
F	Unflammable resistors
G	Oxide metal film resistors
H	Fusible resistors
M	Metal plate resistors
S	Metal glazed resistors
V	Precision metal film resistors
W	Wire wound resistors
X	Metal film resistors
Z	Special resistors

Rated wattage (fourth and fifth digits)

A0	1/10 W
18	1/8 W
16	1/6 W
14	1/4 W
12	1/2 W
01	1 W
02	2 W
03	3 W
04	4 W
05	5 W
06	6 W
07	7 W
75	7.5 W
08	8 W
10	10 W
15	15 W
A6	16 W
20	20 W
30	30 W

Tolerance (seventh digit)

F	±1 %
G	±2 %
J	±5 %
K	±10 %
M	±20 %

Assistant code (twelfth digit)

A	Small type
B	Small type
S	Small type
Y	Lead tapping
Z	Lead tapping

Values (eighth — tenth or eleventh digits)

examples:

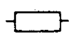
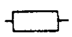
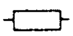
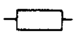
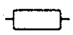
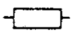
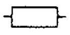
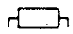
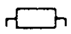
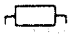
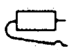
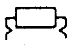
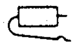
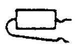
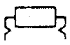
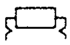
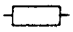
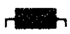
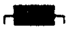
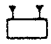
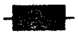
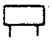
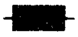
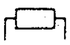
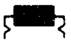
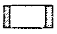
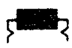
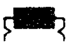
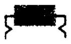
R47		0.47 Ω
4R7		4.7 Ω
470	47×10^0	47 Ω
471	47×10^1	470 Ω
472	47×10^2	4.7 kΩ
473	47×10^3	47 kΩ
474	47×10^4	470 kΩ
475	47×10^5	4.7 MΩ

QRV resistance shown by four digits:

4640	464×10^0	464 Ω
4641	464×10^1	4.64 kΩ
4642	464×10^2	46.4 kΩ

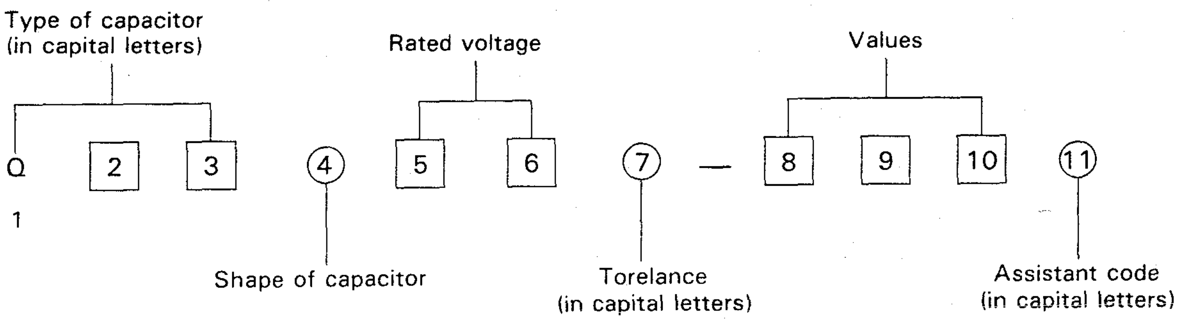
Shape of resistor (sixth digit)

Note: ■ indicates flame retardant resistor.

Type of resistor / Shape of resistor	C	D	F	G	H	M	S	V	W	X
1										
2										
3										
4										
5									(L) type	
6										
7			Lug (B) type							
8			Lug (A) type				 Chip			
9			Lug (C) type							

5.1.2 Fixed capacitor coding

Fixed capacitor part numbers are as follows.


Type of capacitor
(in capital letters)
Rated voltage
Values
Q
1
2
3
4
5
6
7
—
8
9
10
11
Shape of capacitor
Torelance
(in capital letters)
Assistant code
(in capital letters)

Ceramic capacitors

Type of capacitor (first — third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Mono-direction	Kink lead	Axial lead	Axial forming lead	Chip
QCC	Ceramic	1		4	5	
QCD	High capacitance					A
QCF	High capacitance	1,4	3			8,A
QCS	Temperature compensation	1	3	4	5	8,A
QCT	Temperature compensation	Special coding				8,A
QCV	Ceramic			1	3	
QCX	Ceramic			1	3	
QCY	High capacitance	1,4	3	6	7	8,A
QCZ	Special type	Special coding				
QCB	Ceramic			B	C	

Electrolytic capacitors

Type of capacitor (first — third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Tubular	Mono-direction	Anti-stress	Forming	Snap-in
QEB	Low leakage		4	5	6	
QEC	Low leakage		4,8,A	9,B	6,C	
QEE	Tantalum (normal)		4	5	6	
	Tantalum (small)		8			
QEF	Chip tantalum	8 (chip type)				
QEG	Low impedance		4			
QEK	Miniature type		4	5	6	
QEL	Small type		4	5	6	7
QEM	Small type		4,A	5	6	
QEN	Non-polar	2	4	5	6	
QEP	Non-polar (small)		4,A	5,B	6,C	
QER	Miniature type		4	5	6	
QET	Small type	2	4,A	5,B	6,C	7
QEU	Small type		4	5	6	
QEV	Small type		4		6	7
QEW	Normal	2	4	5	6	7

Paper film capacitors

Type of capacitor (first — third digits)		Shape of capacitor (fourth digit)				
		Tubular	Normal		Flame retardant	
Symbol	Characteristics		Mono-direction	Kink lead	Mono-direction	Kink lead
QFA	Metalized polypropylene				7	
QFE	Metalized mylar				5	
QFF	Film mica		4			
QFG	Polypropylene film		4	8		
QFH	Metalized mylar	2	4	3	5,7	6
QFJ	Mylar (special)		4			
QFK	Metalized mylar (small)				5	
QFM	Mylar	2	4	3,7	5	6
QFN	Mylar (small)		4	3		
QFP	Polypropylene		4	3,8		
QFS	Polystyrole	2	4	3		
QFV	Thin film		4	8		
QFZ	Special type	Special coding				

Rated voltage (fifth and sixth digits)

Sixth digit / Fifth digit	A	B	C	D	E	F	G	H	J	K	V	W	X
0						3.15	4.0		6.3				
1	10		16	20	25		40	50	63	80	35		
2	100	125	160	200	250	315	400	500	630		350	450	600
3	1000	1250		2000				5000					

Tolerance (seventh digit)

A	$^{+100}_{-10}$ %	M	± 20 %
F	± 1 %	N	± 30 %
G	± 2 %	P	$^{+100}_{-0}$ %
H	$^{+50}_{-10}$ %	R	$^{+30}_{-10}$ %
J	± 5 %	X	$^{+40}_{-20}$ %
K	± 10 %	Z	$^{+80}_{-20}$ %

Values (eighth — tenth digits)

Example : Values are in picofarads

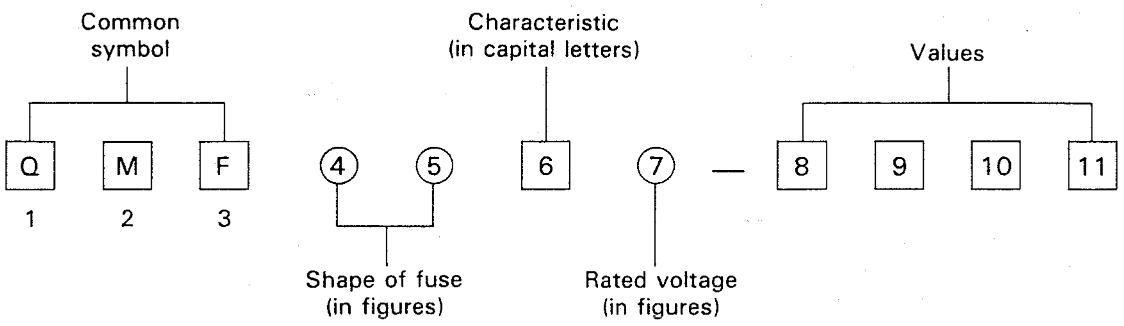
101	10×10^1 pF	100 pF
102	10×10^2 pF	1,000 pF (0.001 μF)
103	10×10^3 pF	10,000 pF (0.01 μF)
104	10×10^4 pF	100,000 pF (0.1 μF)
105	10×10^5 pF	1 μF
5R0		5.0 pF

Assistant code (eleventh digit)

G	Small size
Z	Lead tapping
Y	Lead tapping

5.1.3 Fuse coding

Standard fuse part numbers are as follows.


Common symbol
Characteristic (in capital letters)
Values
Q
M
F
④
⑤
6
⑦
—
8
9
10
11
1
2
3
Shape of fuse (in figures)
Rated voltage (in figures)

Shape of fuse
(fourth and fifth digits)

51	φ5.2×20 mm
60	φ6.4×30 mm
61	φ6.35×31.8 mm
63	φ6.4×30 mm with lead wires
66	φ6.35×31.8 mm with lead wires
00	Special type

Rated voltage
(seventh digit)

1	AC125 V
2	AC250 V
3	0.1−1 A : AC250 V 1.25−6.3 A : AC125 V

Values
(eighth-tenth or eleventh digits)
example:

R63	.... 0.63 A
1R0	.... 1.0 A
2R5	.... 2.5 A
100	.... 10 A
R315	.... 0.315 A
1R25	.... 1.25 A

Characteristics (sixth digit)

Symbol	Fusing Current	Fusing Time	Remarks
A	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 − 10 sec.	
	400 %	0.15 − 3 sec.	
	1000 %	0.02 − 0.3 sec.	
B	210 %	Within 30 min.	Regular fusible type (for SEMKO, Europe)
	275 %	0.05 − 2 sec.	
	400 %	0.01 − 0.3 sec.	
C	135 %	Within 1 hr.	Regular fusible type (for UL, Japan)
	200 %	Within 2 min.	
E	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 − 10 sec.	
	400 %	0.15 − 3 sec.	
	1000 %	0.02 − 0.3 sec.	
J	135 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
M	135 %	Within 1 hr.	Regular fusible type (for UL)
	200 %	Within 2 min.	
R	160 %	Within 1 hr.	Regular fusible type
	200 %	Within 2 min.	
S	160 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
	700 % − 2000 %	Within 0.01 sec.	
U	135 %	Within 1 hr.	Anti-rush type (for UL)
	200 %	Within 2 min.	
	800 % − 2000 %	Within 0.01 sec.	

POWER TRANSFORMER BOARD ASSEMBLY <01>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA	PB20151A	POWER TRANS BOARD ASSY
	Q1	2SA720Q,R,S	TRANSISTOR
	D1	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D2	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D3	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D4	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D5	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D6	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D7	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D8	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D9	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D10	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D11	11E2	DIODE
		OR 11ES2	DIODE
		OR 1SR35-200A	DIODE
		OR S5688G	DIODE
		OR ERA15-02	DIODE
	D12	HZ30-2	ZENER DIODE
	DS1	S4VB10-F2	BRIDGE DIODE
⚠	R1	QRZ0052-100	F RESISTOR
	R2	QRD181J-224	RESISTOR
	R3	QRD181J-222	RESISTOR
	R4	QRD181J-822	RESISTOR
⚠	R5	QRZ0052-221	F RESISTOR
	R6	QRD181J-121	RESISTOR
	C1	QETB1EM-228	E CAPACITOR
	C2	QETB1EM-228	E CAPACITOR
	C3	QETB1CM-478	E CAPACITOR
	C4	QETB1JM-107	E CAPACITOR
	C5	QETB1JM-107	E CAPACITOR
	C6	QETC1VM-106	E CAPACITOR
	C7	QETC1HM-226	E CAPACITOR
	C9	QFK52AK-473	M CAPACITOR
⚠	C101	QCZ9016-472P	CAPACITOR
⚠	S101	QSR0074-016	VOLTAGE SELECTOR
⚠	HD	PU57505	FUSE CLIP, X6 (FOR F1-F3)
	A01	PQ40910	VOL.SEL.COVER
⚠	TAB1	A74316	TAB,X2
	CN1	PU59555-6	CAP HOUSING
	CN2	PU59555-6	CAP HOUSING
⚠	F1	QMF51E2-R80	FUSE,DOES NOT INCLUDE,
⚠	F2	QMF51E2-2R0	FUSE, "
⚠	F3	QMF51E2-R80	FUSE, "

MAIN BOARD ASSEMBLY <03> & <44>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA	PB10084A-01	MAIN BOARD ASSY
⚠	RF1	PU60416	RF CONV & MIXER
	RV1	PU52105	PLASTIC RIVET,X2
	TB1	PU60415A	CONNECTOR BOARD
	WR1	PW30112-N0AF6AF	PARALLEL WIRE
	WR2	PW30401-AB22T	COAXIAL CORD,FOR RF CONV.
		-AUDIO SECTION-	
⚠	IC1	BA7751ALS	IC
	Q1	2SC1740S(RS)	TRANSISTOR
	Q3	2SC1740S(RS)	TRANSISTOR
	Q5	2SC1740S(RS)	TRANSISTOR
	Q6	DTA124ES	TRANSISTOR
	Q7	DTA114ES	TRANSISTOR
	Q8	2SC1740S(RS)	TRANSISTOR
	Q9	2SC1740S(RS)	TRANSISTOR
	Q10	2SC1740S(RS)	TRANSISTOR
	Q11	DTA114ES	TRANSISTOR
	Q12	DTA114ES	TRANSISTOR
	Q13	2SD1450S,T	TRANSISTOR
	Q14	DTC124ES	TRANSISTOR
	D1	1SS133	DIODE
		OR MA165	DIODE
	D2	1SS133	DIODE
		OR MA165	DIODE

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R1	QRD161J-473	RESISTOR
	R2	QRD161J-152	RESISTOR
	R3	QRD161J-222	RESISTOR
	R6	QRD161J-471	RESISTOR
	R7	QRD161J-103	RESISTOR
	R8	QRD161J-152	RESISTOR
	R9	QRD161J-222	RESISTOR
	R13	QRD161J-223	RESISTOR
	R14	QRD161J-102	RESISTOR
	R15	QRD161J-223	RESISTOR
	R16	QRD161J-102	RESISTOR
	R17	QRD161J-102	RESISTOR
	R20	QRD161J-103	RESISTOR
	R21	QRD161J-333	RESISTOR
	R22	QRD161J-102	RESISTOR
	R23	QRD161J-223	RESISTOR
	R25	QRD161J-223	RESISTOR
	R26	QRD161J-100	RESISTOR
	R27	QRD161J-470	RESISTOR
	R28	QRD161J-393	RESISTOR
	R29	QRD161J-221	RESISTOR
	R30	QRD161J-224	RESISTOR
	R31	QRD161J-123	RESISTOR
	R33	QVZ3518-103	V RESISTOR,PB LEVEL
	R34	QRD161J-103	RESISTOR
	R35	QRD161J-122	RESISTOR
	R36	QRD161J-472	RESISTOR
	R37	QRD161J-393	RESISTOR
	R38	QRD161J-183	RESISTOR
	R39	QRD161J-821	RESISTOR
	R40	QRD161J-121	RESISTOR
	R41	QVZ3518-473	V RESISTOR,BIAS ADJ
	R42	QRD161J-333	RESISTOR
	R43	QRD161J-150	RESISTOR
	R44	QRD161J-104	RESISTOR
	R45	QRD161J-8R2	RESISTOR
	C1	QETB1CM-336	E CAPACITOR
	C2	QETC1HM-105	E CAPACITOR
	C3	QCC11EJ-682	CAPACITOR
	C4	QETC1CM-336	E CAPACITOR
	C5	QETC1EM-475	E CAPACITOR
	C7	QCBB1HJ-102	CAPACITOR
	C8	QEB51HM-105	E CAPACITOR
	C9	QETC1CM-106	E CAPACITOR
	C10	QCC11EJ-103	CAPACITOR
	C11	QETC1HM-105	E CAPACITOR
	C12	QETC1HM-105	E CAPACITOR
	C13	QETC1CM-226	E CAPACITOR
	C14	QETC1HM-225	E CAPACITOR
	C15	QETC1HM-105	E CAPACITOR
	C16	QETC1CM-106	E CAPACITOR
	C18	QFV71HJ-273	M CAPACITOR
	C19	QCBB1HJ-331	CAPACITOR
	C20	QFV71HJ-683	M CAPACITOR
	C21	QETC1CM-106	E CAPACITOR
	C22	QCC11EJ-472	CAPACITOR
	C23	QCC11EJ-103	CAPACITOR
	C24	QCC11EK-272	CAPACITOR
	C25	QETC1CM-106	E CAPACITOR
	C26	QETC1CM-336	E CAPACITOR
	C27	QCVB1CN-103	CAPACITOR
	C28	QCBB1HJ-102	CAPACITOR
	L1	PU58308-822J	PEAKING COIL
	L2	PU59152-3R9K	PEAKING COIL

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	T1	PU60017-2	OSC TRANS
	TP	PU57545	TEST PIN,X3

-LUMINANCE SECTION-

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	IC101	PB20166C	Y MODULE BOARD ASSY
⚠	IC102	MSM6967RS	IC
	Q101	2SC1740S(RS)	TRANSISTOR
	Q102	2SC1740S(RS)	TRANSISTOR
	Q103	2SA1309R,S	TRANSISTOR
	Q104	2SC1740S(RS)	TRANSISTOR
	Q105	2SC1740S(RS)	TRANSISTOR
	Q106	2SA1309R,S	TRANSISTOR
	Q107	2SA1309R,S	TRANSISTOR
	Q110	DTC144WS	TRANSISTOR
	Q111	DTC124ES	TRANSISTOR
	Q113	DTC114YS	TRANSISTOR
	Q114	DTC144ES	TRANSISTOR
	D101	1SS133	DIODE
		OR MA165	DIODE
	D102	1SS133	DIODE
		OR MA165	DIODE
	D103	1SS133	DIODE
		OR MA165	DIODE
	D104	RD9.1ESB2	ZENER DIODE
	D105	1SS133	DIODE
		OR MA165	DIODE
	D106	1SS133	DIODE
		OR MA165	DIODE
	D110	1SS133	DIODE
		OR MA165	DIODE
	D111	MA27W(A)	DIODE
	D112	1SS133	DIODE
		OR MA165	DIODE
	D113	1SS292	DIODE
	R101	QRD161J-103	RESISTOR
	R102	QRD161J-102	RESISTOR
	R103	QRD161J-333	RESISTOR
	R104	QRD161J-333	RESISTOR
	R105	QRD161J-102	RESISTOR
	R108	QRD161J-391	RESISTOR
	R109	QRD161J-561	RESISTOR
	R110	QRD161J-333	RESISTOR
	R111	QRD161J-102	RESISTOR
	R112	QVZ3518-222	V RESISTOR,YNR NC BAL
	R113	QRD161J-222	RESISTOR
	R114	QRD161J-102	RESISTOR
	R115	QRD161J-181	RESISTOR
	R116	QRD161J-750	RESISTOR
	R117	QRD161J-102	RESISTOR
	R119	QRD121J-391	RESISTOR
	R120	QRD161J-333	RESISTOR
	R121	QRD161J-102	RESISTOR
	R122	QRD161J-333	RESISTOR
	R123	QRD161J-561	RESISTOR
	R124	QRD161J-101	RESISTOR
	R127	QVZ3518-332	V RESISTOR,PB FREQ RESPONSE
	R128	QRD161J-102	RESISTOR
	R129	QRD161J-102	RESISTOR
	R130	QRD161J-222	RESISTOR
	R133	QRD161J-563	RESISTOR
	R134	QRD161J-750	RESISTOR
	R138	QRD161J-104	RESISTOR
	R139	QRD161J-124	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R141	QRD161J-122	RESISTOR
	R142	QRD161J-681	RESISTOR
	R143	QRD161J-331	RESISTOR
	R144	QRD161J-472	RESISTOR
	R147	QRD161J-562	RESISTOR
	R148	QRD161J-223	RESISTOR
	R149	QRD161J-103	RESISTOR
	R150	QRD161J-222	RESISTOR
	R152	QRD161J-101	RESISTOR
	R153	QRD161J-682	RESISTOR
	R154	QRD161J-222	RESISTOR
	R155	QRD161J-681	RESISTOR
	R160	QRD161J-221	RESISTOR
	R161	QRD161J-153	RESISTOR
	R162	QRD161J-221	RESISTOR
	R163	QRD161J-222	RESISTOR
	R164	QRD162J-394	RESISTOR
	R165	QRD161J-103	RESISTOR
	C101	QCSB1HJ-220	CAPACITOR
	C102	QETC1AM-226ZN	E CAPACITOR
	OR	QETC1AM-226	E CAPACITOR
	C103	QETC1HM-335	E CAPACITOR
	C104	QCVB1CN-103	CAPACITOR
	C105	QCBB1HJ-121	CAPACITOR
	C106	QCBB1HJ-121	CAPACITOR
	C108	QEN61HM-225	NP E CAPACITOR
	C109	QETC1EM-475ZN	E CAPACITOR
	OR	QETC1EM-475	E CAPACITOR
	C110	QCSB1HJ-120	CAPACITOR
	C111	QETC1HM-104ZN	E CAPACITOR
	OR	QETC1HM-104	E CAPACITOR
	C112	QETC1EM-475ZN	E CAPACITOR
	OR	QETC1EM-475	E CAPACITOR
	C113	QCVB1CN-103	CAPACITOR
	C114	QCVB1CN-103	CAPACITOR
	C115	QCVB1CN-103	CAPACITOR
	C116	QETC0JM-476ZN	E CAPACITOR
	OR	QETC0JM-476	E CAPACITOR
	C117	QETC1AM-476ZN	E CAPACITOR
	OR	QETC1AM-476	E CAPACITOR
	C118	QCVB1CN-103	CAPACITOR
	C120	QCVB1CN-103	CAPACITOR
	C121	QETB1CM-106	E CAPACITOR
	C122	QETC1HM-224	E CAPACITOR
	C123	QETC1EM-335ZN	E CAPACITOR
	OR	QETC1EM-335	E CAPACITOR
	C124	QETC0JM-337	E CAPACITOR
	C125	QEN61EM-335	NP E CAPACITOR
	C126	QCVB1CN-103	CAPACITOR
	C127	QCVB1CN-103	CAPACITOR
	C128	QCSB1HJ-470	CAPACITOR
	C129	QETC0JM-476ZN	E CAPACITOR
	OR	QETC0JM-476	E CAPACITOR
	C130	QCVB1CN-103	CAPACITOR
	C131	QETC0JM-477ZN	E CAPACITOR
	OR	QETC0JM-477	E CAPACITOR
	C132	QETC0JM-476ZN	E CAPACITOR
	OR	QETC0JM-476	E CAPACITOR
	C133	QCVB1CN-103	CAPACITOR
	C134	QETC1EM-476ZN	E CAPACITOR
	OR	QETC1EM-476	E CAPACITOR
	C135	QCBB1HJ-102	CAPACITOR
	C136	QCBB1HJ-102	CAPACITOR
	C137	QETC1EM-475ZN	E CAPACITOR
	OR	QETC1EM-475	E CAPACITOR
	C138	QCSB1HK-6R8	CAPACITOR
	C139	QETC0JM-476ZN	E CAPACITOR
	OR	QETC0JM-476	E CAPACITOR
	C140	QCVB1CN-103	CAPACITOR
	C141	QCVB1CN-103	CAPACITOR
	C142	QCVB1CN-103	CAPACITOR
	C143	QCF11HP-103	CAPACITOR
	C145	QCSB1HJ-120	CAPACITOR
	C146	QCBB1HJ-151	CAPACITOR
	C147	QCC11EK-104	CAPACITOR
	C148	QCVB1CN-103	CAPACITOR
	C149	QEN61AM-226	NP E CAPACITOR
	C150	QETC1EM-475	E CAPACITOR
	C152	QCSB1HJ-120	CAPACITOR
	C153	QCBB1HJ-102	CAPACITOR
	C154	QCBB1HJ-102	CAPACITOR
	C155	QCBB1HJ-102	CAPACITOR
	C156	QEN40JM-336	NP E CAPACITOR
	L101	PU59152-121J	PEAKING COIL
	L102	PU59152-221J	PEAKING COIL
	L103	PU59152-560J	PEAKING COIL
	L105	PU59152-101J	PEAKING COIL
	L106	PU48530-101K	PEAKING COIL
	L107	PU48530-101K	PEAKING COIL
	L108	PU59152-680J	PEAKING COIL
	L109	PU48530-101K	PEAKING COIL
	L110	PU59152-180J	PEAKING COIL
	L111	PU48530-101K	PEAKING COIL
	L112	PU48530-101K	PEAKING COIL
	L113	PU48530-101K	PEAKING COIL
	L114	PU59152-101J	PEAKING COIL
	L118	PU53618-R47D	PEAKING COIL
	EQ101	PU60162	EQUALIZER
	EQ102	PU54838	EQUALIZER
	LPF101	PU60161	LOW PASS FILTER
	LPF102	PU58021-2	LOW PASS FILTER
	SLD101	PU60147	SHIELD CASE(1)
	SLD102	PU60148	SHIELD CASE(2)
	SLD103	PU60149	SHIELD CASE(3)
	TP	PU57545	TEST PIN,X4

-VIDEO SUB BOARD SECTION-

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA	PB40016A	VIDEO SUB BOARD ASSY
	IC103	TA7374P	IC
	Q112	2SC2021R,S	TRANSISTOR
	R158	QRD162J-102	RESISTOR
	R159	QRD162J-332	RESISTOR
	L115	PU59152-3R3K	PEAKING COIL
	L116	PU59152-150J	PEAKING COIL
	L117	PU59152-120J	PEAKING COIL
	TML1	PU59935-09	TERMINAL,JP101

-COLOR SECTION-

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
⚠	IC201	PU22046A	C.MODULE BOARD ASSY
	Q201	DTC144ES	TRANSISTOR
	Q202	DTC144ES	TRANSISTOR
	Q203	2SC1740S(RS)	TRANSISTOR
	Q204	2SC1740S(RS)	TRANSISTOR
	Q205	2SC1740S(RS)	TRANSISTOR
	Q206	DTC124ES	TRANSISTOR
	Q207	2SC1740S(RS)	TRANSISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	Q209	DTC144ES	TRANSISTOR
	Q210	DTC144ES	TRANSISTOR
	Q212	DTC144ES	TRANSISTOR
	Q213	2SC1740S(RS)	TRANSISTOR
	Q214	2SC1740S(RS)	TRANSISTOR
	Q252	2SC1740S(RS)	TRANSISTOR
	Q301	DTC144WS	TRANSISTOR
	Q302	2SA1309R,S	TRANSISTOR
	Q303	2SA1309R,S	TRANSISTOR
	Q304	DTC144WS	TRANSISTOR
	D201	1SS133	DIODE
		OR MA165	DIODE
	D202	1SS133	DIODE
		OR MA165	DIODE
	D203	1SS133	DIODE
		OR MA165	DIODE
	D204	1SS133	DIODE
		OR MA165	DIODE
	D205	1SS133	DIODE
		OR MA165	DIODE
	D206	1SS133	DIODE
		OR MA165	DIODE
	D207	1SS133	DIODE
		OR MA165	DIODE
	D208	1SS133	DIODE
		OR MA165	DIODE
	D251	1SS133	DIODE
	D252	1SS133	DIODE
	D253	1SS133	DIODE
	D254	1SS133	DIODE
	D255	1SS133	DIODE
	D256	1SS133	DIODE
	D257	1SS133	DIODE
	D301	1SS133	DIODE
		OR MA165	DIODE
	D302	1SS133	DIODE
	D303	1SS133	DIODE
	R201	QRD161J-222	RESISTOR
	R202	QRD161J-122	RESISTOR
	R203	QRD161J-103	RESISTOR
	R204	QRD161J-103	RESISTOR
	R205	QRD161J-223	RESISTOR
	R206	QRD161J-103	RESISTOR
	R207	QVZ3518-223	V RESISTOR,VXO
	R208	QRD161J-274	RESISTOR
	R209	QRD161J-472	RESISTOR
	R210	QRD161J-102	RESISTOR
	R211	QRD161J-681	RESISTOR
	R214	QVZ3518-331	V RESISTOR,REC COLOR LEVEL
	R215	QRD161J-153	RESISTOR
	R216	QRD161J-222	RESISTOR
	R217	QRD161J-102	RESISTOR
	R218	QRD161J-102	RESISTOR
	R219	QRD161J-103	RESISTOR
	R220	QRD161J-103	RESISTOR
	R221	QRD161J-272	RESISTOR
	R222	QRD161J-681	RESISTOR
	R223	QRD161J-473	RESISTOR
	R224	QRD161J-102	RESISTOR
	R225	QRD161J-102	RESISTOR
	R226	QRD161J-391	RESISTOR
	R227	QRD161J-221	RESISTOR
	R228	QRD162J-682	RESISTOR
	R229	QRD162J-123	RESISTOR
	R230	QRD161J-561	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R231	QRD161J-271	RESISTOR
	R232	QRD162J-562	RESISTOR
	R233	QRD161J-104	RESISTOR
	R234	QRD161J-682	RESISTOR
	R235	QRD161J-122	RESISTOR
	R236	QRD161J-393	RESISTOR
	R237	QRD161J-103	RESISTOR
	R238	QRD161J-103	RESISTOR
	R239	QRD161J-102	RESISTOR
	R240	QRD161J-471	RESISTOR
	R241	QRD161J-152	RESISTOR
	R242	QRD161J-223	RESISTOR
	R243	QRD161J-682	RESISTOR
	R244	QRD161J-102	RESISTOR
	R245	QRD161J-181	RESISTOR
	R246	QRD161J-391	RESISTOR
	R247	QRD161J-331	RESISTOR
	R248	QRD161J-122	RESISTOR
	R249	QRD161J-222	RESISTOR
	R262	QRD161J-393	RESISTOR
	R263	QRD161J-223	RESISTOR
	R264	QRD161J-333	RESISTOR
	R265	QRD161J-822	RESISTOR
	R301	QRD161J-103	RESISTOR
	R304	QRD161J-393	RESISTOR
	R305	QRD161J-682	RESISTOR
	R306	QRD161J-393	RESISTOR
	R307	QRD161J-682	RESISTOR
	R308	QRD161J-103	RESISTOR
	R309	QRD161J-562	RESISTOR
	C201	QETC1CM-106ZN	E CAPACITOR
		OR QETC1CM-106	E CAPACITOR
	C202	QCVB1CN-103	CAPACITOR
	C203	QFN31HJ-273	M CAPACITOR
	C204	QCT25CH-220	CAPACITOR
	C205	QFN31HJ-223	M CAPACITOR
	C206	QETC1HM-105ZN	E CAPACITOR
		OR QETC1HM-105	E CAPACITOR
	C207	QCVB1CN-103	CAPACITOR
	C208	QCSB1HJ-470	CAPACITOR
	C209	QFN31HJ-473	M CAPACITOR
	C210	QCBB1HJ-102	CAPACITOR
	C211	QCVB1CN-103	CAPACITOR
	C212	QCBB1HJ-820	CAPACITOR
	C213	QETC1HM-225ZN	E CAPACITOR
		OR QETC1HM-225	E CAPACITOR
	C214	QETC1CM-106ZN	E CAPACITOR
		OR QETC1CM-106	E CAPACITOR
	C215	QFN31HJ-563	M CAPACITOR
	C216	QFN31HJ-224	M CAPACITOR
	C217	QETC1CM-106ZN	E CAPACITOR
		OR QETC1CM-106	E CAPACITOR
	C218	QFN31HJ-103	M CAPACITOR
	C219	QFN31HJ-104	M CAPACITOR
	C220	QCVB1CN-103	CAPACITOR
	C221	QETC1EM-335ZN	E CAPACITOR
		OR QETC1EM-335	E CAPACITOR
	C222	QFN31HJ-563	M CAPACITOR
	C223	QCVB1CN-103	CAPACITOR
	C224	QETC1EM-475ZN	E CAPACITOR
		OR QETC1EM-475	E CAPACITOR
	C225	QETC0JM-107	E CAPACITOR
	C226	QCVB1CN-103	CAPACITOR
	C227	QCBB1HJ-101	CAPACITOR
	C229	QETC1HM-105ZN	E CAPACITOR
		OR QETC1HM-105	E CAPACITOR
	C230	QETC1EM-475ZN	E CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	OR	QETC1EM-475	E CAPACITOR
	C231	QETC1EM-475ZN	E CAPACITOR
	OR	QETC1EM-475	E CAPACITOR
	C232	QCVB1CN-103	CAPACITOR
	C233	QCBB1HJ-102	CAPACITOR
	C234	QETC0JM-476ZN	E CAPACITOR
	OR	QETC0JM-476	E CAPACITOR
	C235	QCVB1CN-103	CAPACITOR
	C236	QCSB1HK-5R6	CAPACITOR
	C237	QCVB1CN-103	CAPACITOR
	C238	QCVB1CN-103	CAPACITOR
	C259	QCBB1HJ-102	CAPACITOR
	L201	PU48530-101K	PEAKING COIL
	L202	PU48530-271J	PEAKING COIL
	L203	PU48530-222J	PEAKING COIL
	L204	PU59153-822J	PEAKING COIL
	L205	PU59153-101K	PEAKING COIL
	L206	PU59152-150J	PEAKING COIL
	L207	PU48530-101J	PEAKING COIL
	L208	PU59152-820J	PEAKING COIL
	L301	PU48530-101K	PEAKING COIL
	EQ201	PU53501-6	EQUALIZER
	LPF201	PU58705	LOW PASS FILTER
	LPF202	PU54988	LOW PASS FILTER
	BPF201	PU57072	BAND PASS FILTER
	BPF202	PU54410-2	BAND PASS FILTER
	DL201	PU58971-2	2H DELAY LINE
	OR	PU59413	2H DELAY LINE
⚠	XB201	PU58023	CRYSTAL BLOCK
⚠	OR	PU58126	CRYSTAL BLOCK
	X201	PU60307	CRYSTAL RESONATOR
	OR	PU59335	CRYSTAL RESONATOR
	OR	PU31449-4K	CRYSTAL RESONATOR
	TP214	PU50766-2	TEST PIN
	TP	PU57545	TEST PIN,X3

-SECAM DETECTOR BOARD ASSY <44>-

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA	PB30005A-01	SECAM DETECTOR BOARD ASSY
	IC251	BA7007	IC
	Q251	2SC1740S(RS)	TRANSISTOR
	R251	QRD161J-103	RESISTOR
	R252	QRD161J-562	RESISTOR
	R253	QRD161J-333	RESISTOR
	R254	QRD161J-393	RESISTOR
	R255	QRD161J-102	RESISTOR
	R256	QRD161J-393	RESISTOR
	R257	QVZ3521-472	V RESISTOR,SECAM DET
	R258	QRD161J-563	RESISTOR
	R259	QRD161J-182	RESISTOR
	R260	QRD161J-154	RESISTOR
	R261	QRD161J-332	RESISTOR
	C251	QFN31HJ-562	M CAPACITOR
	C252	QCVB1CN-103	CAPACITOR
	C253	QETC1CM-106ZN	E CAPACITOR
	OR	QETC1CM-106	E CAPACITOR
	C254	QFN31HJ-223	M CAPACITOR
	C255	QER61CM-476	E CAPACITOR
	C256	QCVB1CN-103	CAPACITOR
	C257	QETC1AM-336ZN	E CAPACITOR
	OR	QETC1AM-336	E CAPACITOR
	C258	QFN31HJ-122	M CAPACITOR
	L251	PU49057	LC BLOCK
	L252	PU59153-562J	PEAKING COIL
	L253	PU48530-101K	PEAKING COIL
	CF251	PU56983	CERAMIC FILTER
	TML2	PU60330-10	TERMINAL,JP251
	TP251	PU57545	TEST PIN

-SERVO SECTION-

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	IC401	HD49712NT	IC
	OR	HD49712ANT	IC
	Q402	2SC3311AQ,R,S	TRANSISTOR
	D401	1SS133	DIODE
	OR	MA165	DIODE
	D402	1SS133	DIODE
	OR	MA165	DIODE
	D403	1SS133	DIODE
	OR	MA165	DIODE
	D404	1SS133	DIODE
	OR	MA165	DIODE
	D405	1SS133	DIODE
	OR	MA165	DIODE
	R401	QRD161J-102	RESISTOR
	R402	QRD161J-105	RESISTOR
	R403	QRD161J-103	RESISTOR
	R404	QRD161J-333	RESISTOR
	R405	QRD161J-684	RESISTOR
	R406	QRD161J-152	RESISTOR
	R409	QRD161J-105	RESISTOR
	R410	QRD161J-153	RESISTOR
	R411	QRD161J-333	RESISTOR
	R413	QRD161J-272	RESISTOR
	R414	QRD161J-472	RESISTOR
	R415	QRD161J-102	RESISTOR
	R416	QRD161J-105	RESISTOR
	R417	QRD161J-273	RESISTOR
	R418	QRD161J-105	RESISTOR
	R419	QRD161J-105	RESISTOR
	R420	QRD161J-273	RESISTOR
	R421	QRD161J-273	RESISTOR
	R422	QRD161J-105	RESISTOR
	R423	QRD161J-104	RESISTOR
	R424	QRD161J-222	RESISTOR
	R427	QRD161J-102	RESISTOR
	R428	QRD161J-104	RESISTOR
	R429	QRD161J-104	RESISTOR
	R430	QVZ3518-684	V RESISTOR,PB SW POINT
	R432	QRD161J-332	RESISTOR
	R433	QRD161J-103	RESISTOR
	R434	QVZ3521-474	V RESISTOR,V PULSE POSITION
	R435	QRD161J-101	RESISTOR
	R436	QRD161J-102	RESISTOR
	R437	QRD161J-222	RESISTOR
	R438	QRD161J-221	RESISTOR
	R439	QRD161J-563	RESISTOR
	R440	QRD161J-153	RESISTOR
	R441	QRD161J-223	RESISTOR
	R442	QRD161J-682	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R443	QRD161J-102	RESISTOR
	R444	QRD161J-102	RESISTOR
	R445	QRD161J-103	RESISTOR
	R446	QRD162J-102	RESISTOR
	R447	QRD161J-103	RESISTOR
	R448	QRD161J-334	RESISTOR
	R453	QRD161J-471	RESISTOR
	C401	QCBB1HJ-102	CAPACITOR
	C402	QETC1AM-226	E CAPACITOR
	C403	QETC1AM-226	E CAPACITOR
	C404	QCSB1HJ-150	CAPACITOR
	C405	QCBB1HJ-102	CAPACITOR
	C406	QETC1HM-105	E CAPACITOR
	C407	QCXB1CN-222	CAPACITOR
	C408	QETC1HM-105	E CAPACITOR
	C409	QCBB1HJ-102	CAPACITOR
	C410	QCBB1HJ-102	CAPACITOR
	C411	QETC1HM-224	E CAPACITOR
	C412	QETC1AM-226	E CAPACITOR
	C415	QFN31HJ-682	M CAPACITOR
	C416	QETC1EM-475	E CAPACITOR
	C417	QETC1EM-475	E CAPACITOR
	C418	QETC1CM-106	E CAPACITOR
	C419	QETC1CM-106	E CAPACITOR
	C420	QEN61HM-105	NP E CAPACITOR
	C421	QFV71HJ-104	M CAPACITOR
	C422	QCBB1HJ-471	CAPACITOR
	C423	QFN31HJ-682	M CAPACITOR
	C424	QCBB1HJ-102	CAPACITOR
	C425	QEN61HM-105	NP E CAPACITOR
	C426	QCBB1HJ-102	CAPACITOR
	C430	QETC1CM-106	E CAPACITOR
	C431	QEK61HM-474	E CAPACITOR
	C432	QCBB1HJ-102	CAPACITOR
	C433	QCBB1HJ-102	CAPACITOR
	C434	QCVB1CN-103	CAPACITOR
	TP GND	PU57545	TEST PIN
	CN402	PU58844-5	CAP HOUSING

-MECHACON SECTION-

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	IC601	M50731-623SP	IC
	OR	M50965E-305SP	IC
	OR	M50731-626SP	IC
	IC602	BA6259N	IC
	IC603	M54647L	IC
	IC604	BA6222	IC
	Q601	2SC3311A(RS)	TRANSISTOR
	D601	MA165	DIODE
	OR	1SS133	DIODE
	D602	MA165	DIODE
	OR	1SS133	DIODE
	D603	HZS4.3EB2	ZENER DIODE
	D604	HZS7.5EB2	ZENER DIODE
	D605	MA165	DIODE
	OR	1SS133	DIODE
	D606	1SS133	DIODE
	OR	MA165	DIODE
	D607	HZS7.5EB2	ZENER DIODE
	R601	QRD161J-152	RESISTOR
	R602	QRD161J-103	RESISTOR
	R603	QRD161J-103	RESISTOR
	R604	QRD161J-122	RESISTOR
	R605	QRD161J-823	RESISTOR
	R606	QRD161J-102	RESISTOR
	R607	QRD161J-102	RESISTOR
	R608	QRD161J-102	RESISTOR
	R609	QRD161J-472	RESISTOR
	R610	QRD161J-103	RESISTOR
	R611	QRD161J-105	RESISTOR
	R614	QRD161J-472	RESISTOR
	R615	QRD161J-472	RESISTOR
	R616	QRD161J-472	RESISTOR
	R617	QRD161J-472	RESISTOR
	R618	QRD161J-472	RESISTOR
	R619	QRD161J-472	RESISTOR
	R620	QRD161J-472	RESISTOR
	R621	QRD161J-472	RESISTOR
	R622	QRD161J-472	RESISTOR
	R623	QRD161J-472	RESISTOR
	R624	QRD161J-472	RESISTOR
	R625	QRD161J-472	RESISTOR
	R626	QRD161J-472	RESISTOR
	R627	QRD161J-472	RESISTOR
	R628	QRD161J-124	RESISTOR
	R629	QRD161J-124	RESISTOR
	R630	QRD161J-333	RESISTOR
	R631	QRD161J-472	RESISTOR
	R632	QRD161J-332	RESISTOR
	R634	QRD161J-103	RESISTOR
	R635	QRD161J-331	RESISTOR
	R636	QRD161J-822	RESISTOR
	R640	QRD161J-124	RESISTOR
	R641	QRD161J-124	RESISTOR
	R642	QRD161J-124	RESISTOR
	R644	QRD161J-124	RESISTOR
	R648	QRD161J-153	RESISTOR
	R649	QRD181J-271	RESISTOR
	RA602	QRB049J-103	RESISTOR ARRAY
	OR	QRB047J-103	RESISTOR ARRAY
	RA603	QRB049J-472	RESISTOR ARRAY
	OR	QRB047J-472	RESISTOR NETWORK
	C601	QCFB1EZ-223	CAPACITOR
	C602	QCFB1EZ-223	CAPACITOR
	C604	QETC1EM-335ZN	E CAPACITOR
	OR	QETC1EM-335	E CAPACITOR
	C605	QETC1EM-475ZN	E CAPACITOR
	OR	QETC1EM-475	E CAPACITOR
	C606	QETC1EM-475ZN	E CAPACITOR
	OR	QETC1EM-475	E CAPACITOR
	C607	QETC1EM-475ZN	E CAPACITOR
	OR	QETC1EM-475	E CAPACITOR
	C608	QETC1HM-105ZN	E CAPACITOR
	OR	QETC1HM-105	E CAPACITOR
	C613	QCC11EK-473	CAPACITOR
	C614	QCF31HP-223	CAPACITOR
	L601	PU59152-100J	PEAKING COIL
	L602	PU59152-2R7J	PEAKING COIL
⚠	CF601	PU60030	RESONATOR
⚠	OR	PU60125	RESONATOR
	HS1	PU60158	HEAT SINK
	SCW1	SBSE3006Z	TAPPING SCREW,X2
	SCW2	SBSE3008Z	TAPPING SCREW
	CN601	PU59934-15	WIRE HOLDER
	CN603	PU59555-6	CAP HOUSING
	CN604	PU59555-5	CAP HOUSING

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	CN605	PU59555-8	CAP HOUSING
	CN606	PU58844-4	CAP HOUSING
⚠	CP602	ICP-F25	CIRCUIT PROTECTOR
		-REGULATOR SECTION-	
	IC801	STK5481	IC
	D801	MA165	DIODE
	OR	1SS133	DIODE
	R801	QRD161J-682	RESISTOR
	R802	QRD161J-272	RESISTOR
	R803	QRD161J-223	RESISTOR
	C801	QETC1CM-476ZN	E CAPACITOR
	OR	QETC1CM-476	E CAPACITOR
	C802	QETC1CM-107ZN	E CAPACITOR
	OR	QETC1CM-107	E CAPACITOR
	C803	QETC1CM-476ZN	E CAPACITOR
	OR	QETC1CM-476	E CAPACITOR
	C804	QETC0JM-476ZN	E CAPACITOR
	OR	QETC0JM-476	E CAPACITOR
	C805	QETC1EM-106ZN	E CAPACITOR
	OR	QETC1EM-106	E CAPACITOR
⚠	HS2	PQ31691	HEAT SINK
	SCW1	SDSB3014Z	TAPPING SCREW,X2
	SCW2	SDSB3010Z	TAPPING SCREW,X2
	TP	PU57545	TEST PIN,X3

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IF BOARD ASSEMBLY <07>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA	PB10007S-01	IF BOARD ASSY
	IC1	M51496P	IC
	Q1	2SC2636T	TRANSISTOR
	Q2	2SD1450S,T	TRANSISTOR
	OR	2SD1468S(RSE)	TRANSISTOR
	Q3	2SC3399	TRANSISTOR
	OR	UN4213	TRANSISTOR
	OR	DTC144ES	TRANSISTOR
	Q4	2SC536SPA(FG)	TRANSISTOR
	OR	2SC3311AR,S	TRANSISTOR
	OR	2SC1740S(RS)	TRANSISTOR
	Q5	2SA933S(RS)	TRANSISTOR
	OR	2SA1309AR,S	TRANSISTOR
	Q6	2SC536SPA(FG)	TRANSISTOR
	OR	2SC3311AR,S	TRANSISTOR
	OR	2SC1740S(RS)	TRANSISTOR
	Q7	2SA933S(RS)	TRANSISTOR
	OR	2SA1309AR,S	TRANSISTOR
	Q8	2SC536SPA(FG)	TRANSISTOR
	OR	2SC3311AR,S	TRANSISTOR
	OR	2SC1740S(RS)	TRANSISTOR
	Q9	2SD1450S,T	TRANSISTOR
	OR	2SD1468S(RSE)	TRANSISTOR
	Q11	2SC536SPA(FG)	TRANSISTOR
	OR	2SC3311AR,S	TRANSISTOR
	OR	2SC1740S(RS)	TRANSISTOR
	D1	MTZ11B	ZENER DIODE
	OR	UZ11BSB	ZENER DIODE
	OR	RD11ES-T1B2	ZENER DIODE
	D4	1SS133	DIODE
	D5	1SS133	DIODE
	R2	NRD718J-750NBU	RESISTOR
	R6	NRD718J-822NBU	RESISTOR
	R7	NRD718J-472NBU	RESISTOR
	R8	NRD718J-220NBU	RESISTOR
	R9	NRD718J-271NBU	RESISTOR
	R10	NRD718J-101NBU	RESISTOR
	R11	NRD718J-102NBU	RESISTOR
	R17	NRD718J-472NBU	RESISTOR
	R18	QVZ3518-102	V RESISTOR , AGC
	R19	NRD718J-102NBU	RESISTOR
	R22	NRD718J-103NBU	RESISTOR
	R23	NRD718J-472NBU	RESISTOR
	R24	NRD718J-103NBU	RESISTOR
	R28	NRD718J-103NBU	RESISTOR
	R29	NRD718J-102NBU	RESISTOR
	R30	NRD718J-394NBU	RESISTOR
	R31	NRD718J-394NBU	RESISTOR
	R32	NRD718J-272NBU	RESISTOR
	R34	NRD718J-561NBU	RESISTOR
	R35	NRD718J-221NBU	RESISTOR
	R36	NRD718J-102NBU	RESISTOR
	R37	NRD718J-271NBU	RESISTOR
	R39	NRD718J-153NBU	RESISTOR
	R42	NRD718J-152NBU	RESISTOR
	R43	QVZ3518-103	V RESISTOR , COLOR LEVEL
	R44	NRD718J-102NBU	RESISTOR
	R45	NRD718J-102NBU	RESISTOR
	R47	NRD718J-471NYU	RESISTOR
	R49	NRD718J-102NBU	RESISTOR
	R56	NRD718J-222NBU	RESISTOR
	R61	NRD718J-471NBU	RESISTOR
	R62	NRD718J-104NYU	RESISTOR
	R63	NRD718J-223NBU	RESISTOR
	R64	NRD718J-392NBU	RESISTOR
	R65	NRD718J-103NBU	RESISTOR
	R66	NRD718J-471NBU	RESISTOR
	R67	NRD718J-223NBU	RESISTOR
	R68	NRD718J-223NBU	RESISTOR
	R69	NRD718J-103NYU	RESISTOR
	C5	NCX71CM-222NBR	CAPACITOR
	C6	NCX71CM-222NBR	CAPACITOR
	C7	NCX71CM-222NBR	CAPACITOR
	C8	NCX71CM-222NBR	CAPACITOR
	C11	PU57601-224MEZ	E CAPACITOR
	C12	NCY71CM-103NBR	CAPACITOR
	C13	QEK61CM-476	E CAPACITOR
	C14	NCX71CM-222NBR	CAPACITOR
	C17	QEK61CM-106	E CAPACITOR
	C18	NCY71CM-103NBR	CAPACITOR
	C19	QFL31HJ-182	M CAPACITOR
	C21	NCS71HJ-330NBR	CAPACITOR
	C22	NCB71HK-101NBR	CAPACITOR
	C25	QCT25CH-270	CAPACITOR
	C32	NCS71HJ-470NBR	CAPACITOR
	C41	QEK61CM-226	E CAPACITOR
	C42	QEK61CM-336	E CAPACITOR
	C43	NCF71EZ-223NBR	CAPACITOR
	C44	QEK61HM-474	E CAPACITOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	L2	PU60025-1R1	PEAKING COIL
	L3	PU60025-1R8	PEAKING COIL
	L5	PU59152-150J	PEAKING COIL
	L7	PU59152-220J	PEAKING COIL
	CF2	PU58558-2	CERAMIC FILTER
	CF4	PU32990-2	CERAMIC FILTER
	SAW1	PU35557-5	SAW FILTER
	T1	PU59982-2	IF.TRANSFORMER
	T2	PU59983-2	IF.TRANSFORMER
	T3	PU60046	IF.TRANSFORMER
	T4	PU60176-2	IF.TRANSFORMER
	TML1	PU59935-16	TERMINAL,JP1

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TUNER CTL BOARD ASSEMBLY <08><35>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA	PB20015R	TUNER CTL BOARD ASSY

-TUNER CTL BOARD ASSY <08>-

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA1	PB20015R1	TU CTL BOARD ASSY
	IC1	LA7910	IC
	IC2	BA10358	IC
		OR M5223P	IC
	Q1	2SB810H,J	TRANSISTOR
	Q2	DTC144ES	TRANSISTOR
		OR 2SC3399	TRANSISTOR
		OR UN4213	TRANSISTOR
	Q4	2SA1309AR,S	TRANSISTOR
	Q5	2SA720Q,R,S	TRANSISTOR
		OR 2SB1278(QR)	TRANSISTOR
	Q6	2SC1740S(S)	TRANSISTOR
		OR 2SC3311AS	TRANSISTOR
	D1	LTZ-MR15	ZENER DIODE
	D2	HZT33-02	ZENER DIODE
	D6	1SS133	DIODE
	D7	1SS133	DIODE
	R1	QRD161J-182	RESISTOR
	R2	QRD161J-153	RESISTOR
	R5	QRD161J-181	RESISTOR
	R6	QRD161J-332	RESISTOR
	R7	QRD161J-473	RESISTOR
	R8	QRD161J-121	RESISTOR
	R9	QRD161J-473	RESISTOR
	R10	QRD161J-103	RESISTOR
	R11	QRD161J-103	RESISTOR
	R12	QRD161J-333	RESISTOR
	R13	QRD161J-331	RESISTOR
	R14	QRD161J-394	RESISTOR
	R15	QRD161J-154	RESISTOR
	R16	QRD161J-154	RESISTOR
	R17	QRD161J-154	RESISTOR
	R18	QRD161J-103	RESISTOR
	R25	QRD161J-472	RESISTOR
	R26	QRD161J-472	RESISTOR
	R27	QRD161J-104	RESISTOR
	R28	QRD161J-472	RESISTOR
	R35	QRD161J-472	RESISTOR
	R36	QRD161J-472	RESISTOR
	R37	QRD161J-123	RESISTOR
	R38	QRD161J-123	RESISTOR
	R62	QRD161J-103	RESISTOR
	R63	QRD161J-103	RESISTOR
	C2	QETC1CM-106	E CAPACITOR
	C4	QCBB1HJ-101	CAPACITOR
	C5	QETC1HM-106	E CAPACITOR
	C7	QCVB1CM-103	CAPACITOR
	C8	QFV71HJ-333	M CAPACITOR
	C9	QFV71HJ-153	M CAPACITOR
	C10	QFV71HJ-333	M CAPACITOR
	C11	QFV71HJ-153	M CAPACITOR
	C15	QETC1CM-106	E CAPACITOR
	C16	QETC1HM-105	E CAPACITOR
	C17	QETC1CM-106	E CAPACITOR
	C18	QETC1HM-225	E CAPACITOR
	C19	QETC1CM-106	E CAPACITOR
	C21	QETC1CM-106	E CAPACITOR
	L4	PU59152-6R8K	PEAKING COIL
⚠	TH1	PU52108-4R7K	POSITIVE THERMISTOR
	CN1	PU59555-7	CAP HOUSING
	CN2	PU59555-6	CAP HOUSING
⚠	CP1	ICP-F10	CIRCUIT PROTECTOR
⚠	TNR1	PU60292	TUNER
	HD1	PU36416	HOLDER

-MEMORY BOARD ASSY <35>-

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA2	PB20015A2	MEMORY BOARD ASSY
	IC101	MN1220	IC
	R101	QRD161J-104	RESISTOR
	R102	QRD161J-104	RESISTOR
	R103	QRD161J-104	RESISTOR
	CN101	PU60168-7	CAP HOUSING

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AUDIO/CONTROL HEAD BOARD <12>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWB1	PU58016	A/C HEAD BOARD
	BKT1	PQ43014	BRACKET
	SCW1	SPSH1740	MINI SCREW
	CN1	PU54537-5	CAP HOUSING
	CN2	PU54537-2B	CAP HOUSING

TIMER/DISPLAY BOARD ASSEMBLY <21>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA	PU22491H	TIMER/DISPLAY BOARD ASSY
	IC1	UPD75208CW-097	IC
		OR UPD75208CW-139	IC
	IC2	M5278L56	IC
	IC3	**IC-PST523H-2**	**IC**
	Q1	2SC3401	TRANSISTOR
		OR DTC144WS	TRANSISTOR
	D1	1SS133	DIODE
	D2	1SS133	DIODE
	D3	1SS133	DIODE
	D4	1SS132	DIODE
	D5	1SS132	DIODE
	D6	1SS132	DIODE
	D7	1SS132	DIODE
	D8	1SS132	DIODE
	D9	1SS132	DIODE
	D13	1SS132	DIODE
	D16	RD10ES-T1B2	ZENER DIODE
		OR UZ10BSB	ZENER DIODE
	D17	1SS133	DIODE
	D18	MA27TB	DIODE
	R2	QRD161J-224	RESISTOR
	R3	QRD161J-333	RESISTOR
	R4	QRD161J-102	RESISTOR
	R5	QRD161J-333	RESISTOR
	R6	QRD161J-273	RESISTOR
	R7	QRD161J-472	RESISTOR
	R9	QRD161J-103	RESISTOR
	R10	QRD161J-103	RESISTOR
	R11	QRD161J-103	RESISTOR
	R12	QRD161J-103	RESISTOR
	R14	QRD161J-103	RESISTOR
	R15	QRD161J-103	RESISTOR
	R16	QRD161J-103	RESISTOR
	R17	QRD161J-103	RESISTOR
	R18	QRD161J-103	RESISTOR
	R19	QRD161J-103	RESISTOR
	R22	QRD161J-102	RESISTOR
	R25	QRD161J-103	RESISTOR
	R26	QRD161J-103	RESISTOR
	R27	QRD161J-103	RESISTOR
	R28	QRD161J-103	RESISTOR
	R29	QRD161J-103	RESISTOR
	R30	QRD161J-103	RESISTOR
	R35	QRD161J-333	RESISTOR
	R36	QRD161J-333	RESISTOR
	R37	QRD161J-333	RESISTOR
	R38	QRD161J-102	RESISTOR
	R39	QRD161J-333	RESISTOR
	RA1	QRB057J-104	RESISTOR ARRAY
	RA2	QRB047J-224	RESISTOR ARRAY
	RA3	QRB077J-224	RESISTOR ARRAY
	C1	QER61CM-336	E CAPACITOR
	C2	QER60JM-336	E CAPACITOR
	C3	PU60177	E CAPACITOR, 0.022/5.5
	C6	QCVB1CN-103	CAPACITOR
	C7	QCVB1CN-103	CAPACITOR
	C8	QCVB1CN-103	CAPACITOR
	C9	QCVB1CN-103	CAPACITOR
	C10	QER61CM-106	E CAPACITOR
	C14	QER60JM-336	E CAPACITOR
⚠	CF1	PU59545	RESONATOR
	S1	PU53598-2	TACT SWITCH,CLOCK ADJUST
	S2	PU53598-2	TACT SWITCH,PROGRAM
	S3	PU53598-2	TACT SWITCH,TIMER
	S4	PU53598-2	TACT SWITCH,SET(-)
	S5	**PU53598-2**	**TACT SWITCH,CANCEL**
	S6	**PU53598-2**	**TACT SWITCH,REPEAT**
	S7	PU53598-2	TACT SWITCH,SELECT
	S8	PU53598-2	TACT SWITCH,SET(+)
	S9	PU53598	TACT SWITCH,MODE
	S10	PU53598	TACT SWITCH,CHANNEL DOWN
	S12	PU53598-2	TACT SWITCH,CHANNEL SET
	S13	PU53598	TACT SWITCH,RESET
	S14	PU53598	TACT SWITCH,CHANNEL UP
	S210	PU53598-2	TACT SWITCH,TRACKING(+)
	S211	PU53598-2	TACT SWITCH,TRACKING(-)
	S402	PU58488-1-1	SLIDE SWITCH,COUNTER MEMORY
	S403	PU58486-1-1	SLIDE SWITCH,AFC
	FDP1	PU59951-2	FLUORESCENT DISPLAY PANEL
	HD1	PQ31215-1-4	FDP HOLDER(R)
	HD2	PQ31163-1-4	FDP HOLDER(L)
	TP1	PU56008	TEST PIN
	CN5	PU60169-7	HOUSING

OPERATION BOARD ASSEMBLY <22>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA	PB20001A-01	OPERATION BOARD ASSY
	IC201	GP1U501	IFR UNIT
		OR SPS-403	IFR UNIT
	D200	MTZ5.1	ZENER DIODE
	D201	SLR-34VC3F	LE DIODE,POWER
	D202	SLR-34VC3F	LE DIODE,REC
	D203	SLR-34VC3F	LE DIODE,PAUSE
	D204	SLR-34MC3F	LE DIODE,PLAY
	R200	QRD161J-102	RESISTOR
	R202	QRD161J-331	RESISTOR
	R203	QRD161J-331	RESISTOR
	R204	QRD161J-331	RESISTOR
	R211	QRD161J-222	RESISTOR
	R212	QRD161J-222	RESISTOR
	R213	QRD161J-332	RESISTOR
	R214	QRD161J-472	RESISTOR
	R215	QRD161J-103	RESISTOR
	R216	QRD161J-222	RESISTOR
	R217	QRD161J-222	RESISTOR
	R218	QRD161J-183	RESISTOR
	R219	QRD161J-223	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R220	QRD161J-563	RESISTOR
	R221	QRD161J-471	RESISTOR
	S201	PU57550	TACT SWITCH,POWER
	S203	PU57550	TACT SWITCH,EJECT
	S204	PU57551	TACT SWITCH,STOP
	S205	PU57551	TACT SWITCH,PAUSE
	S206	PU57551	TACT SWITCH,PLAY
	S207	PU57551	TACT SWITCH,REW
	S208	PU57551	TACT SWITCH,FF
	S209	PU57551	TACT SWITCH,REC
	HD1	PQM30038	LED HOLDER,X4

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UPPER DRUM BOARD <41>

	PWB1	PDM3017	UPPER DRUM BOARD

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PRE/REC BOARD ASSEMBLY <43>

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PWBA	PU36328D	PRE/REC BOARD ASSY
	IC1	AN3380K	IC
	OR	AN3380NK	IC
	Q1	2SA1309R,S	TRANSISTOR
	Q2	2SC1740S(RS)	TRANSISTOR
	Q3	2SC1740S(RS)	TRANSISTOR
	Q4	DTC144WS	TRANSISTOR
	Q6	2SC1740S(RS)	TRANSISTOR
	D2	1SS133	DIODE
	OR	MA165	DIODE
	D3	1SS133	DIODE
	OR	MA165	DIODE
	R1	QRD161J-102	RESISTOR
	R2	QRD161J-222	RESISTOR
	R3	QRD161J-222	RESISTOR
	R4	QRD161J-391	RESISTOR
	R5	QRD161J-821	RESISTOR
	R6	QRD161J-391	RESISTOR
	R7	QRD161J-222	RESISTOR
	R8	QRD161J-222	RESISTOR
	R9	QRD161J-102	RESISTOR
	R10	QRD161J-122	RESISTOR
	R11	QRD161J-821	RESISTOR
	R12	QRD161J-331	RESISTOR
	R15	QRD161J-122	RESISTOR
	R16	QRD161J-153	RESISTOR
	R17	QRD161J-103	RESISTOR
	R18	QRD161J-222	RESISTOR
	R19	QRD161J-222	RESISTOR
	R20	QRD161J-332	RESISTOR
	R21	QRD161J-561	RESISTOR
	R22	QRD161J-391	RESISTOR
	R23	QRD161J-181	RESISTOR
	R24	QRD161J-151	RESISTOR
	R25	QRV144F-3742AY	RESISTOR
	R26	QRD161J-562	RESISTOR
	R27	QRD162J-333	RESISTOR
	C1	QETC0JM-476ZN	E CAPACITOR
	OR	QETC0JM-476	E CAPACITOR
	C2	QCVB1CN-103	CAPACITOR
	C3	QCVB1CN-103	CAPACITOR
	C5	QCVB1CN-103	CAPACITOR
	C6	QCSB1HJ-270	CAPACITOR
	C7	QCSB1HJ-560	CAPACITOR
	C9	QCSB1HJ-270	CAPACITOR
	C10	QCVB1CN-103	CAPACITOR
	C11	QCVB1CN-103	CAPACITOR
	C12	QCVB1CN-103	CAPACITOR
	C13	QFV41HJ-104	TF CAPACITOR
	C15	QEE41AM-335	TANTAL CAPACITOR
	C17	QCSB1HJ-680	CAPACITOR
	C18	QCVB1CN-103	CAPACITOR
	C19	QFV41HJ-104	TF CAPACITOR
	C20	QER61CM-106	E CAPACITOR
	C21	QCBB1HJ-820	CAPACITOR
	C22	QCBB1HJ-820	CAPACITOR
	C23	QER61CM-106	E CAPACITOR
	C24	QCVB1CN-103	CAPACITOR
	C25	QEE40JM-685	E CAPACITOR
	C26	QETC0JM-476ZN	E CAPACITOR
	OR	QETC0JM-476	E CAPACITOR
	C27	QCBB1HJ-121	CAPACITOR
	C29	QCSB1HK-4R7	CAPACITOR
	C31	QCVB1CN-103	CAPACITOR
	L1	PU48530-101K	PEAKING COIL
	L3	PU59152-560J	PEAKING COIL
	L4	PU59152-470J	PEAKING COIL
	L6	PU59152-330J	PEAKING COIL
	L7	PU48530-101K	PEAKING COIL
	L8	PU59152-680J	PEAKING COIL
	L9	PU59152-100J	PEAKING COIL
	L10	PU59152-8R2J	PEAKING COIL
	L11	PU59152-150J	PEAKING COIL
	BKT1	PQ42955	PWB BRACKET
	ETH1	PQ40433-2	EARTH LUG
	SCW1	DPSP2606Z	SCREW,X3
	SLD1	PQ42959	SHIELD CASE
	SLD2	PQ42960	SHIELD PLATE
	SLD3	PQ42961	SHIELD COVER
	SPC1	WBS2600Z	WASHER
	CN1	PU58844-8	CAP HOUSING
	CN2	PU58844-6	CAP HOUSING
	CN3	PU56258-4	CAP HOUSING

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DECK TERMINAL BOARD ASSEMBLY <51>

	PWBA1	PU22509A1	DECK TERMINAL BOARD ASSY
	R1	QRD181J-151	RESISTOR
	R3	QRD181J-331	RESISTOR

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION
	PHS1	GP3A21	PHOTO INTERRUPTER
	WR1	PW30110-26DD885	PARALLEL WIRE,DOES NOT INCL.
	CN1	PU59933-15	WIRE TRAP

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RELAY BOARD ASSEMBLY <52>

	PWBA2	PU22509C2	RELAY BOARD ASSY
	LC1	PU59809-222T	N FILTER
	LC2	PU59809-222T	N FILTER

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REC SAFETY BOARD ASSEMBLY <53>

	PWBA3	PU22509A3	REC SAFETY BOARD ASSY
	S1	PU58644-1-3	REC SAFETY SWITCH

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END SENSOR BOARD ASSEMBLY <54>

	PWBA4	PU22509A4	END SENSOR BOARD ASSY
	Q1	PN268R-NC	PHOTO TRANSISTOR
	HD1	PQ31047	END SENSOR HOLDER
	CN1	PU59945-102	WIRE SOCKET

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CASSETTE HOUSING BOARD <56>

	PWBA	PB30043	CASSETTE HOUSING BOARD
	Q1	PN268R-NC	PHOTO TRANSISTOR
	R1	QRD161J-471	RESISTOR
	PHS1	PU58879	PHOTO INTERRUPTER
	CN1	PU58844-106	CAP HOUSING

#⚠	REF NO.	PART NO.	PART NAME, DESCRIPTION